The Chemical Age

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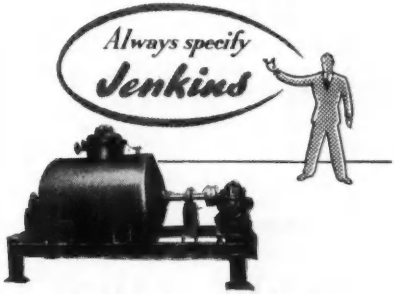

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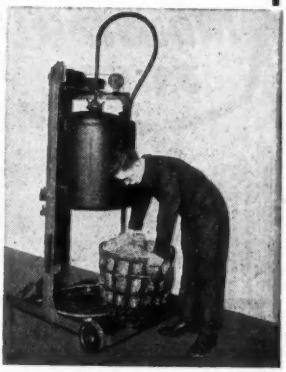

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The
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Chemicals versus Weeds

IT is only ten years since the first synthetic and selective weed-killing chemical was discovered at I.C.I.'s agricultural research station in Berkshire. Yet already the importance of this new branch of applied chemistry is so great that the United Nations Food and Agriculture Organisation has this year published a special handbook (Agricultural Study No. 13, HMSO, 3s. 6d.) entirely devoted to it. We have perhaps taken for granted in our own time one of the most remarkable and rapid pieces of progress of all time. To-day thousands of tons of the new growth-regulating selective weed-killers are regularly used in many different parts of the world. It is unusual in any industry, and particularly in so conservative an industry as agriculture, for a single research discovery to be put into such large and widespread use in no more than a decade. Indeed, practical application has far outstripped fundamental research. The detailed physiological action of these hormone-type organic chemicals is not yet fully understood. Field tests results and farm experience are together accumulating more evidence than scientists can gather together and digest. The primary object of the FAO booklet is to bring together the main conclusions of different workers.

If the extensive use of this new class of chemicals has developed at a remarkable rate, the practical variations in all this development are even more remarkable. At least five major and different weed-controlling hormonal chemicals are in large-scale use. They are used, too, in various basic forms, as pure substances, as their sodium salts, their amine salts, or as esters. Different dosage rates have been found necessary for different crop-weed relationships. Climate and local conditions are also significant influences. Application by low-volume as well as by high-volume liquid spraying methods has now been developed. Dust application is also practised and for large areas spraying from the air, both by fixed-wing planes and helicopters, is no longer a novelty. The most recent development is treating the bare soil with these new weed-killers before the crop itself emerges; results so far are somewhat confusing but there have been enough successes to put this latest phase of progress into the promising class. Nor is it only the weeds of the land that have become victims of selective chemical warfare. Water-weeds like the ditch- and

stream-clogging water hyacinth have been controlled without any accompanying and adverse effects upon more desirable water life.

It is sometimes assumed that these new chemicals are very limited in their fields of use, that only cereal crops and grasses are sufficiently immune to their plant actions. Already this is not entirely true. Sugar-cane, for example, is powerfully resistant to hormone-type weedkillers. And, though grasses can be treated as a resistant crop, one of the newer chemicals in this group can effectively control grasses that appear as weeds on other cropland. These are clear tokens that the original field is beginning to widen.

All too often the introduction of new chemicals into agriculture's complex and natural equilibria has brought new problems in solving old ones. As a class, the selective weedkillers have so far provided mankind with benefits that are free from subsidiary snags. Both MCPA and 2,4-D, the two major selective weedkillers, are harmless to man and animals. The only serious trouble has been caused by the drift of applications on to adjacent and more susceptible crops, a disability not of the chemical substance itself but of the mode of application. The record of these new agricultural chemicals in their first decade must be regarded as exceptionally good. In such rapidly expanding development many more failures through misuse or mishap might have been expected; and as a ten-year period is long enough for unexpected biological consequences at least to begin to reveal themselves the fact that no serious reprisals from Nature have so far been reported is highly encouraging.

All this, or much of it is, of course, well known to agricultural chemists today. The excellent summary of progress which FAO has produced serves as a reminder as well as a stock-taking landing on the stairway of progress. Nevertheless, because more than one chemical substance is used for selective weed-control by growth-regulation and because development has expanded with such uncontroversial smoothness, we tend to forget that it was only in 1941 that the first such synthetic chemical was made by British research workers. Already a great new branch of agricultural chemical industry has been established, in itself indisputable evidence that practical farmers have readily supported this major advance in chemical control. This young family of selective weed-killers may well take level rank with the penicillin family in any list of twentieth century chemical achievements.

On Other Pages

The annual subscription to THE CHEMICAL AGE is 35s. Single copies, 9d.; post paid, 1s.: SCOTTISH OFFICE 116 Hope Street, Glasgow (Central 3970). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham (Midland 0784-5). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited.

Notes & Comments

Sulphur Needs Unpopular

IN the United States sulphur is now distributed on a nation-wide basis—a new order, M-69, prohibits suppliers from consigning sulphur without National Production Authority licences. Consumers must also submit requests for sulphur that detail the proposed uses and they are in any case restricted to a ceiling of 100 per cent of their 1950 consumption. One early result of the new allocation system is believed to be an increase in the amount of sulphur for agricultural use—fertilisers, fungicides, etc. In recent months the U.S. agricultural chemicals industry has been getting a smaller share of the available sulphur supplies than the new scheme should allow. Exports to Britain are to some extent controlled by the same NPA department. While many industrialists are on this subject openly developing a dangerously anti-British viewpoint, NPA spokesmen are pointing out that Britain should require only 90,000 tons in the third quarter of 1952 and 70,000 in the final quarter; and during 1953, only 270,000 tons in all as compared with 400,000 tons in 1950. These published estimates are apparently based upon the report of the technical team that recently visited this country to obtain a first-hand picture of our efforts to reduce usage of sulphur.

A Better Press Needed

IT is undoubtedly and regrettably the policy of some sections of the U.S. technical press to present British sulphur requirements in the blackest possible light. In one recent article the total schedule of export tonnage from America was given as 900,000 tons for 1951. The next sentence stated that most of the exports will go to Britain. Yet in the same article a paragraph or two later our 1950 import tonnage—now in any case cut—was given as 400,000 tons. Even 4 tons out of every 9 is not reasonably described as 'most' but it seems that any argument is acceptable if it makes Britain a scapegoat for the sulphur shortage. In another recent article —a leader—British requests for U.S. sulphur were compared with imaginary requests for $2,000 U.S. cars. Such cars being cheaper than Daimlers at $3,000, if allocated to Britain on a basis of so much per cent of American production, would save British buyers $1,000 per car. An argument of this nature is no contribution to Anglo-American understanding. Cars are made in both countries; but sulphur is not produced in both countries. The readers of technical and scientific journals in the United States must surely realise that it takes time to convert large plant from the use of sulphur to the use of other sulphur-containing materials. One conclusion is only too clear. As the allocation system for sulphur to American users tightens—and this seems generally expected—exports to Britain will become more and more unpopular. Any evidence or suggestion that we are losing time in introducing sulphur economy will make it acutely difficult for NPA to provide export allocations on a reducing and minimum requirement basis. It is essential that our efforts to use materials other than sulphur in acid manufacture should be publicised in the United States. If American trade papers will take the trouble to investigate the matter they will find that Britain is doing its utmost to find alternative sources of sulphur and to save on its consumption. We do not object to fair criticism but we can and do expect fair treatment from all reputable journals.

Jubilee Congratulations

TO the young, old age seems rather uninviting, but as the mellowing years increase any misgivings tend to be dispelled, and the passing of time and experience gained become rather matters for satisfaction. As with individuals and families, so also with firms, tradition is a matter which in Britain has long played—and it is hoped will continue to play—an important part. Congratulations are deservedly due to the Power-Gas Corporation, Ltd., which last week celebrated its Golden Jubilee. The occasion was indeed very much a family affair, for the firm's eventful history is

largely based on the family bond. Both Rose, Downs & Thompson, Ltd. (acquired at the beginning of this year) with a life of nearly two centuries, and Ashmore, Benson, Pease & Co., Ltd., with its 78 years, were launched by privately owned family groups, and it is significant in these days of rapid and enforced changes that one can point to their long, vigorous life and constant growth under free enterprise in spite of wars, industrial revolutions, booms and slumps, changes of Government and management. Along with every new advance, the personal and family interests have been spread and interwoven in the wider community of the growing business. The jubilee also coincided with the completion of 50 years' service to the firm by its chairman, Mr. W. Beswick, who contributes a delightful preamble to the special issue of the corporation's journal, 'Concord', produced in connection with the celebrations. Comparing his firm's development with the growth of the River Tees, Mr. Beswick points out that it is a tidal river, subject to flood tides and to ride its waters any craft must be seaworthy. Mutual trust, mutual help and mutual regard, had enabled his firm to weather the storms of the last 50 years held together by the family spirit.

Grinding with Liquid Nitrogen

THE Americans have evolved a method of grinding hitherto ungrindable materials by the expedient of spraying them with liquid nitrogen to bring them down to very low temperatures, says an article in *Chemical Engineering* of June 1951. Materials which at ordinary temperatures are either too tough, or have low melting points and incline to melt with the heat produced, become very brittle at low temperatures down to $-320°F$. Examples of the materials in question are vitamins and pharmaceuticals (any substance, for example, containing vitamin A or carotene, or anything else very sensitive to oxidation, and such things as penicillin and the sulpha drugs), insecticides like DDT and toxaphene; foods such as mace, nutmeg, lards, coffee, and the like; and tough plastics such as polystyrene, vinyls, ultra-fine acrylates as used for dentures, and Buna N. A further advantage of this treatment preparatory to grinding is that the low temperature prevents loss of volatile constituents, higher pulverising rates are possible, and an inert atmosphere is automatically ensured for such things as explosives and high purity products.

An interesting stand by J. W. Towers & Co. Ltd., at the recent British Instrument Industries Exhibition at Olympia, London

SCI's Seventieth Annual Meeting

Festival of Britain Gathering a Great Success

THE seventieth annual meeting of the Society of Chemical Industry, which was held in London from 9-13 July, was a great success and no doubt will help chemists remember the 'Festival Year'. More than 850 members and guests attended one or more of the many functions which had been so admirably organised by Dr. Monkhouse and the members of his committee.

The meeting opened with a reception by the hosts, the London Section, at the Geological and Science Museum, South Kensington, at 8 p.m. on Monday, 9 July, and ended with a reception by the chairman and directors of I.C.I. at the Connaught Rooms, Kingsway at 8.30 on Friday. In between were crammed numerous luncheons, social excursions, works visits, lectures and dinners. In every respect the 70th annual meeting was enjoyable as well as worth-while.

The seventieth annual general meeting of the Society was held on Tuesday morning, 10 July, at the Royal College of Science (Imperial College). The president, Mr. Stanley Robson, was in the chair.

It was announced that the following loyal message had been sent to H.M. the King:—

'May it please Your Majesty, the President, Council and Members of the Chemical Industry, gathered together under Your Majesty's patronage at their 70th annual meeting, in London, send loyal greetings and humbly express the sincere hope that Your Majesty will soon be restored to health'.

The King's Reply

The following reply was received:—

'The King sincerely thanks you and all members of the Council and members of the Society, assembled at the 70th annual meeting, for your kind and loyal message, which His Majesty, as your Patron, warmly appreciates'.

There were also many messages of greeting from the Society's Sections and members overseas. They included a cable from the immediate past president, Sir David Rivett, who was in Australia, and from Mr. W. P. Cohoe, a past president, who is in the United States.

Dr. Emil Ott conveyed on behalf of the American Section of the Society a message of most cordial greetings and best wishes for the success of the meeting and for the continued success of the Society; and he expressed his own sense of honour, as well as of privilege and pleasure, in being allowed to present those greetings.

The American Section, he said, had to face the competition of other technical societies. Nevertheless, it continued to play a vital rôle and to fill a real need.

Further, he expressed his personal pleasure in being in London again, and particularly he noted the more cheerful atmosphere. It was a source of great enjoyment to him to meet so many friends and to partake of the fellowship of the Society in this country, and he hoped that at some time in the future he would be privileged to do so again.

Proud of American Section

The president acknowledged and expressed the Society's thanks. The Society was proud of the loyal American Section, he said, and valued very highly the friendships which had been formed with its members over many years. It was also a very great pleasure indeed that the message should have been conveyed by Dr. Ott, a very good friend of the Society.

Dr. Stafford, who described himself as the newly-hatched chairman of the Canadian Section, having been appointed during his journey to this country, conveyed the greetings of that section. The Canadian Section, he said, had always felt very close to the mother Society, and had persisted, in spite of some other attractions, in maintaining a very active link. He was very proud to be present at the meeting in London and to say that the section in Canada would continue to go along with the mother organisation.

Mr. Robson again expressed appreciation, and asked Dr. Stafford to convey it to all friends and members in Canada.

Dr. E. B. Hughes, the hon. secretary, in presenting the Council's annual report, said that for some considerable time the Council had been working on the revision of the By-Laws, and by the end of 1950 they were ready for approval. A draft would be ready for submission to the members later.

The year had been a difficult one in respect of publications. Nevertheless, with the help and work of the Publications Committee,

with the editor and the publications secretary, publications had been maintained satisfactorily. 1950 had seen the launching of the new *Journal of the Science of Food and Agriculture*, and at the end of that year the Council had approved alterations in another journal, which had adopted a new title and format. Being entitled *The Journal of Applied Chemistry*, it could claim to cover the whole field of applied chemistry.

After drawing attention to the imposing list under the heading 'Awards and Lectures', he said that membership had been maintained satisfactorily. Nevertheless, the Council were very anxious to bring into the Society all those who could benefit by its membership, as they would do in view of the increasing publications; and if they benefited, they must benefit the Society.

Sectional Activity

The sections and groups provided evidence, through their proceedings, of the great activity of the Society, and he drew attention particularly to the activities of the overseas sections. No new section or group was formed during 1950, but the Agriculture Group had formed a very active and keen panel; towards the end of that year the Council had approved a suggestion that the Microbiological Panel of the Food Group should become a group, and it had since been launched as a group.

Mr. John Rogers, O.B.E., F.R.I.C. (chairman of Imperial Chemical Industries, Ltd.) was elected president of the Society, on the motion of the retiring president, Mr. Stanley Robson, who commented on his very long standing as a member. Mr. Rogers, he said, was a very worthy president and was extremely pleased to accept nomination and election. The Society was grateful to him, and Mr. Robson wished him the support, the friendship and the help that he himself had enjoyed as president during the last two years. Mr. Rogers, who would take office at the end of the meetings in London, had the good wishes of all.

Other officers elected were:—*Vice-presidents*: W. M. Ames, H. Baines, W. H. Brindley, G. J. Esselen, L. A. Jordan, A. Marsden, H. V. Potter, Sir David Rivett, S. Robson, H. Greville Smith, J. W. Tullo, and W. H. J. Vernon.

Hon treasurer: Julian M. Leonard; *Hon. Foreign Secretary*: L. H. Lampitt; *Hon. secretary*: E. B. Hughes, and *Hon. Publications Secretary*: F. P. Dunn.

Mr. Robson, in his second presidential address during two years of office, first expanded on one or two matters dealt with in the Annual Report of Council and indicated the directions which the Society's affairs had been taking during the past year.

There was no increase in the number of sections, but the Overseas Section, which had had no particular routine or duty, was brought into more active operation. That step was taken at the inspiration of the Hon. Foreign Secretary, Dr. Lampitt, who had pointed out that there were a great many members in certain parts of the Continent of Europe whose contact with the Society was only by virtue of its publications, and that was a needless restriction. On his suggestion, a meeting was held in Paris, at which Mr. Robson had presided. It had transpired that there were in that great city quite a number of chemists who were members of the Society, but had never met each other during, in some cases, several years of residence there. The meeting was most enjoyable and useful, and had brought together members of the Society into social and also possibly scientific contact, which could not have been done in any other way.

French Visit London

Referring to the visit of members of the *Société de Chimie Industrielle* to London, headed by their president, M. Bienaime, Mr. Robson said the occasion had afforded the members of the Society of Chemical Industry an opportunity to return some of the hospitality which in the past had been extended so lavishly to them when they had visited Paris. It was hoped that there would be further opportunities in the future to entertain visitors from overseas, because such occasions were extremely helpful in fostering friendship between those of similar profession who belonged to different countries.

Another splendid feature was the development of the cordial and intimate relations of the Society with other chemical bodies. One of his predecessors in office, Professor Sir Eric Rideal, had become president of the Chemical Society, which was very gratifying to the SCI; and the honour recently bestowed upon him by H.M. the King was a source of great pride to the Society.

Mr. H. W. Cremer, a past vice-president of the Society, past hon. secretary and an active member of the Publications Committee, and past chairman of the Chemical Engineering Group, was the reigning president of

the Royal Institute of Chemistry. Professor E. C. Dodds, the S.C.I. Medallist in 1951, was also chairman of the Biochemical Society; he had been a member of the Council of the S.C.I. for a number of years. Dr. Nichols, the hon. treasurer of the Food Group of the S.C.I., was president of the Society of Public Analysts.

Thus it was seen that the splendid background which exists behind the chemical societies was one in which the S.C.I. participated fully, and it was of great help.

In view of the difficulties nowadays of maintaining publications at the level to which the Society had been accustomed, it was most gratifying to note the very great progress made, and the very great improvement in the quality and the make-up of the *Journal*. The new *Journal of the Science of Food and Agriculture* was a venture which would fill the members of the Society with pride as time passed.

Again, in the last year or two, the Society had held a series of conferences, the proceedings of which had been published separately. During the past year the conference on materials of construction in the chemical industry was a very great success indeed, and the president hoped that the new Council, in its wisdom, would consider it wise to continue the policy of arranging such conferences.

New Groups

Another trend in the policy of the Society which had had his utmost support was the formation of new groups. The Society, being concerned with applied chemistry and the chemical industry, had a very large field of human endeavour to cover. Chemistry reached out year by year into new fields, and the number of subject groups had been increased by three in 1951—the Microbiological Group, the Corrosion Group and the Oils and Fats Group. The creation of new groups was of vital interest and support to the Society, and he hoped that that trend would go on. At the inaugural meetings of the new groups some wonderfully fine addresses had been delivered.

The difficulty of obtaining more suitable premises for the Society's headquarters was still a great handicap; on three occasions during the last war the present offices had been damaged. But endeavours were still being made to obtain better accommodation, for the Society must be better housed, whatever happened in connection with the scheme for a scientific centre, which the Government had approved and had declared its intention to establish. Gratitude was due to the Royal Society for its leadership in the work of preparing the scheme, and it was hoped that not more than a few years would elapse before the magnificent building envisaged was established.

Speaking of the Society's finances, Mr. Robson paid tribute to the extremely good housekeeping which had been exercised. When listening to the hon. treasurer's presentation of the accounts at that meeting, he said, the members must have been impressed by the obvious care with which the finances were managed, by the provision which had been made in the accounts for emergencies, and the use of that provision, particularly in regard to the Bureau of Abstracts.

Supplies of Sulphur

The second part of the president's address was concerned with the problem of sulphur supplies, and he outlined some of the outstanding developments in that connection over a period of more than a hundred years, for although the history of sulphur had been plainly set out, he felt it was worth tracing the tangled web in simple terms, though he emphasised that he knew of no means of immediately meeting the present shortage.

Dr. R. T. Colgate proposed the thanks of the meeting to the president for his wonderful address, and said that all would wish to acclaim him, for he had done great work for the Society throughout the years, and he had also been engaged in work of great national importance in connection with the manufacture of acid, particularly sulphuric acid. One was not sure that sulphur was a suitable subject on which the president should dilate, because so far as one knew he had no direct connection with the devil; he was not a sulphurous person. But all would look forward to the publication of his address and would study it to their pleasure and their instruction.

The president had given also evidence, if such were needed, of the virile and progressive spirit existing in the Society, which one felt was going to make that body the greatest international scientific society in the world. One noted that it was steadily feeding other societies with their presidents, and that was another indication of the friendly efficiency and *esprit* in the Society.

In regard to Chemistry House, one was

delighted to know that such a fine scheme existed on paper, and looked forward to its transformation into bricks and mortar, because all were convinced of its necessity in order to achieve the unification that was so much desired.

The members and guests were entertained to luncheon in the Mayfair Hotel, Berkeley Street, on Tuesday, 10 July, by the London Section of the Society. Dr. Monkhouse welcomed the Society to London on the occasion of its 70th annual meeting, and he proposed its health.

It was appropriate, he said, that in this year of the Festival of Britain the annual meeting should be held in the capital, where the Society had its headquarters. He offered a special welcome to visitors from overseas and to members of the many sections and groups of the Society who had travelled long distances to attend; to Mr. J. C. Mann, a former chairman of the Midlands Section, who was attending his jubilee annual meeting; and to the many ladies who were present.

Professor Dodds Honoured

On Wednesday morning the members and guests assembled at the Royal Institution, in Albemarle Street, W.1, to witness the presentation, by the president, of the Society's Medal to Professor E. C. Dodds, M.V.O., F.R.S., D.Sc., Ph.D., M.D., F.R.C.P., F.R.I.C., F.R.S.E., who lectured on 'The Decisive Influence of Chemical Industry on Medicine'.

Mr. Robson, who introduced Professor Dodds, said the Society's Medal had been awarded to a great many very distinguished people. It was first awarded in 1896 to John Glover, whose work was well known to those interested in the heavy chemical industry. The second recipient was Sir William Perkin, and the names of those to whom it had been awarded subsequently included Professor Renson, Ludwig Mond, Nobel, Sir William Crookes, Henry Roscoe and Paul Kestner, who had rendered very distinguished services to chemistry and to the chemical industry. In awarding the Medal to Professor Dodds the Society was adding a worthy name to that list.

It was not possible to describe in a few words the achievements of and the services which Professor Dodds had rendered to chemistry and to mankind as a whole. At a very early age he had achieved distinction, and he had since continued to uphold it. He was Courtauld Professor of Biochemistry in the University of London when he was only 25 years old. So distinguished was his work that the Courtauld family had augmented the endowment and the Courtauld Institute of Biochemistry was formed. Very great work had been done there since that time.

Professor Dodds was a man of strong character, determination and personality, and those who were privileged to know him appreciated also what a kindly, friendly and unassuming man he was. He had travelled widely at the invitation of other institutes and had helped them considerably in their work. As a result, and by his own innate characteristics, he had gained a culture and a love of things which were beautiful to an unusual extent.

By inviting him to accept the medal, the Society honoured a man whose contributions to chemistry and to the welfare of mankind had been very real, and it honoured itself, adding one more to a very illustrious list of Medallists.

Professor Dodds, on receiving the Medal, was warmly applauded. He confessed that he found it impossible to express adequately his feelings as the recipient of so great an honour, and his appreciation of the very kind remarks the president had made. He was afraid Mr. Robson had given a rather exaggerated picture of his accomplishments; and of the many pieces of good fortune that had come his way in recognition, he regarded the Society's Medal as certainly the most unexpected, and one which he would always rank as one of the greatest.

Chemistry and Medicine

Following the delivery of the Medallist's address the president commented that Professor Dodds, with his usual modesty, had made very little reference to his own contributions. One was glad, however, that he had made some reference to the interplay between the rôles of chemical industry and of medicine, and he could be assured that chemists would never forget that in the early days of their science much had depended upon the inspiration and help and direction that medicine had given to chemistry. Mistakes there were in some ways; nevertheless, chemistry in its early days was greatly inspired by medical men.

Mr. F. H. Carr, the senior past president of the Society, and one who has been concerned with the preparation and manufacture

of medicine and medicinal chemicals, proposed a vote of thanks to Professor Dodds. It was, he said, a fascinating account of one of the greatest chapters of experimental science, of work which had done more than anything else to promote human happiness and relief from anxiety and pain. The progress described was due to a combination of scientific activities in the realms of biochemistry and bacteriology, physiology and pharmacology, men in those separate sciences working together with organic chemists in research. It was a great privilege to members of chemical industry to hear a lecture by a man who was not only a great chemist, but a great biochemist and a great physiologist. The part he had played, and the work of many of his colleagues, was not to be made light of. As he had shown in his lecture, it was the combined effect of research in all the various directions he had indicated that had resulted in a wonderful accession of happiness and relief to humanity during the last fifty years.

National Plan for India

Importance of the Chemical Industries

CHEMICAL industries play a prominent rôle in the five-year scheme for India recently released. Under the title 'Planning in a Democratic State,' the report, prepared by the Planning Commission, headed by the Prime Minister, emphasises India's need for industrial development and the importance of support for the plan, not only from more advanced countries, but also in her own territories.

The commission was set up in March 1950, by a resolution of the Government of India. In July of that year, it was called upon at short notice to prepare a six-year plan of economic development for the country to be placed before the Commonwealth Consultative Committee. The Five-Year Plan, based on detailed examination of resources, in some ways represents an advance over the Colombo Plan of which some of the original proposals have been excluded or modified.

Reviewing the industrial development which has taken place in recent years, the commission sets forth the following main aims for the Five-Year Plan for industry: (1) Meeting the demands for industrial products on account of schemes for agricultural development and expansion of irrigation and power; (2) fuller utilisation of existing capacity of producer goods industries such as jute, and consumer goods like cotton textiles, sugar and soap; (3) expanding the capacity of industries producing heavy chemicals, pig iron, steel, which are of basic importance to the general economic development of the country; (4) completion of industrial units on which a part of the capital expenditure has already been incurred; (5) removing, as far as possible, the problems and drawbacks in the existing industries.

With these considerations in view the commission has drawn up a five-year programme of development for the main industries in consultation with their various representatives.

Estimated production for 1955-56 is given in comparison with production in 1950-51 (in thousands of tons) as follows: Heavy chemicals: sulphuric acid 180 (102), soda ash 78 (44), caustic soda 29 (11). Fertilisers: superphosphate 179 (52), ammonium sulphate 100 (47). Salt: 3,075 (2,622). Soap: 270 (102). Cement: 4,600 (2,613).

Foreign capital, the report states, should naturally be welcomed, particularly as it would ensure the supply of capital goods and technical knowledge, and make it possible to utilise foreign patented processes.

Importance of developing the small-scale industries is stressed in view of the desirability of centralising industry and relieving middle class unemployment.

The chemical industries, it is pointed out, show promise of considerable expansion. Production increases are anticipated of about 250 per cent in superphosphates, about 200 per cent in ammonium sulphate, 80 per cent in sulphuric acid, 75 per cent in soda ash, 160 per cent in caustic soda, and 400 per cent in power alcohol. If these targets are realised, it will make a large contribution to the prosperity of India.

Carbon Black Unit

Now beginning operations is the new $2,000,000 carbon black plant of Continental Oil Black Co., of America, at Lake Charles, La. Annual capacity will be over 10,000 tons of high-abrasion furnace black. It will use petroleum raw materials. Output will go largely into synthetic rubber—especially 'cold rubber.'

Coal Shortage Hits German Industry

International Co-operation Urged

COAL allocations to chemical works in Western Germany were cut severely this month. The chemical industry as a whole is to receive 80,300 tons at the normal price for domestic coal and 44,700 tons at the higher price charged for imported coal, a total of 125,000 tons compared with an average of 250,000 tons in the second quarter of 1951 when coal supplies were already regarded as inadequate.

There appears to be little hope of any early substantial improvement in this position, and chemical manufacturers are therefore endeavouring to find alternative fuels. Production of chemicals is, however, bound to be sharply affected.

Coal-Oil Industry Affected

The coal-oil industry is naturally particularly perturbed about the growing shortage of its main raw material, the more so as unexpectedly great difficulties have been met in procuring steel and credits for the projected repair and modernisation work.

Supplies of coke and tar products for chemical purposes have not been cut as drastically as that of coal and may be expected to increase slightly; nevertheless prospects are not good.

At the Bochum meeting Dr. Tramm, of Ruhrchemie AG, claimed that Ruhrchemie and Lurgi had improved the Fischer-Tropsch process sufficiently to ensure it being a practical proposition even at the present higher prices—'subject to certain prerequisites'. The principal improvements concern the catalyst, the efficiency of the contact ovens, and the preceding coal gasification which has been rendered both simpler and cheaper.

It is characteristic of the changed situation brought about by the inability of the Ruhr mines to meet domestic demand that the hydrogenation and synthesis interests are among those clamouring for lower import duties on mineral oils and tar products.

West German chemical exports to other European countries have failed to come up to expectations. Although the balances run up by many of Germany's trade partners might have encouraged them to allow larger imports of German manufactures into their countries, German exporters have in fact suffered from the uncertainty created by the lack of balance in German foreign commerce.

Several leading German dye makers have greatly extended their range of manufactures and express satisfaction with the results achieved. A new trade agreement has also been concluded with Australia, but this is of little practical interest to the German chemical industry.

German non-ferrous metal smelters have naturally been hit by the coal shortage. Stolberger Zink reports that while the level of zinc and lead production is satisfactory, plans to increase output of zinc have had to be postponed because of lack of fuel. The supply of foreign raw materials for the lead smelter is said to have deteriorated while the price of foreign materials is above the parity of the domestic price for lead as sold by the smelter. Hochofenwerk Lübeck intends to set up new installations for the recovery of zinc and will also extend its copper smelting plant.

'Schuman Plan'

Prominent members of the German chemical industry have been studying the possibilities and problems of a 'Schuman plan for the chemical industry', and further preparatory studies on possible co-operation under Government auspices with the chemical industries of neighbouring countries are to be made. For the time being, however, said President Menne, of Arbeitsgemeinschaft Chemische Industrie, the Schuman plan is not to be extended to the chemical industry. West German chemical interests, it appears, would prefer co-operation with foreign producers on a private cartel basis, more or less on prewar lines.

It is feared that the German cartel bill now in preparation might prevent such arrangements. The argument is advanced that even if agreements between producers with a view to curbing competition between them were to be rejected in a free enterprise economy, they are practically indispensible in Germany's present foreign exchange position. Absence of international arrangements would isolate the German chemical industry and render the conclusion of constructive trade agreements more difficult.

Simon Group's New Laboratories

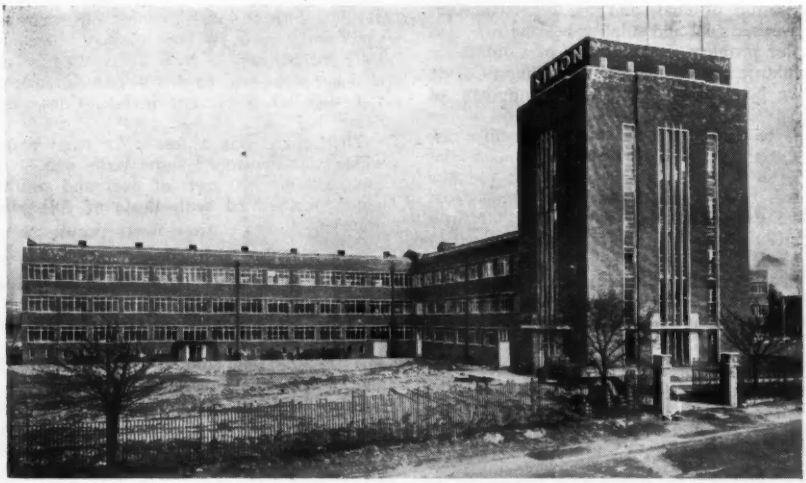
Firm to Conduct Specialised Research

IN our last issue we reported briefly on the opening of the research and development departments of the Simon Engineering Group at Cheadle Heath, Stockport, but time and space limitations prevented us from describing these new facilities. As this expansion is on a large scale and has created considerable interest in the chemical engineering and coking industries, a brief description follows:—

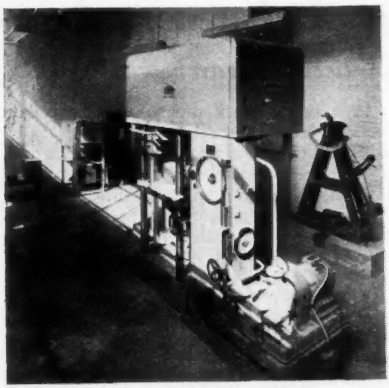
As engineering designers and contractors, the Simon group of companies some time ago decided that there was an imperative need for them to conduct their own specialised kinds of applied research, from their own direct viewpoint. It was decided that only with the foundation of their own scientific knowledge, gained at first hand by their own scientific staff, could they shoulder the technical and financial risks of building elaborate and costly installations. Plans, therefore, were drawn up and once the requisite licences had been granted work began. On Tuesday of last week more than 250 visitors saw just how thoroughly this had been carried out.

In a single block of buildings, excellent facilities have been provided for work to be done on coal cleaning, coal carbonisation, treatment of coal by-products, fuel combustion, steam generation, sulphuric acid production, gasworks ancillary processes, electrostatic precipitation, pneumatic and mechanical handling of bulk materials and flour and provender milling engineering.

As far as Simon-Carves, Ltd., is concerned, the research department is a central organisation serving all of its contracting departments. Its work falls under three main headings: mechanical and chemical testing, research, and information. No less than nine laboratories, with ancillary rooms, are devoted to the preparation of samples, 'washability' tests, and examination of the coking qualities of coals for carbonisation, and of the calorific value, ash fusion and grindability of coals for boiler firing. Extensive facilities are also provided for testing the refractory materials used in coke ovens and boiler combustion chambers, and for metallurgical tests, including heat treatment and microscopic examination of the metals



Part of the Simon research and development buildings at Cheadle Heath. Simon-Carves laboratories are on the left; the tower contains an experimental flour mill



Compression tester capable of a total load of 300 tons

used in plant construction. There is a large analytical laboratory for general chemical analysis.

A large and varied programme of research has been mapped out and much of it is physical. One field in which the firm is especially interested is that of the behaviour of small particles with special reference to sedimentation, the collection, extraction and disposal of industrial mists and dusts, pulverisation of coal, and the combustion of pulverised fuel and sulphur-bearing ores. A major problem is the supply of sulphur for sulphuric acid manufacture, as Simon-Carves have been prominent among suppliers of this type of plant for many years, and studies will be made of new sources for this raw material. Among the sources under consideration are recovery from waste and flue gases, removal as hydrogen sulphide from town gas, and the flash roasting of iron pyrites. Interest is also being maintained in the micro-biological process.

Studies are also planned on certain aspects of the problem of effluents from gas works and coke ovens and there is ample scope for work on the corrosion-resistance of metals. Long-range plans are being laid to investigate heat and mass transfer coefficients to provide absorption data for sulphuric acid manufacture and to study the electrical factors in electrostatic precipitation, with special reference to migration velocities, the wave form of applied potentials and corona discharge.

Work in the development department is in two categories. The first involves new principles and the study of new processes from the laboratory through pilot plant stages of increasing size; the object of the early stages is usually to gain data on the operation of individual units of plant, from which successively larger units are designed, while in the later stages the units are integrated into a complete plant. The second category involves no new principle but calls for a study of the operating characteristics of existing full-scale plants, the results being applied to the design of future installations or the modification of those already in use.

Site investigations on commercial plants are facilitated by a mobile laboratory fully equipped with test apparatus and instruments.

On the day of the opening, four plants had been built or were in the process of being erected in the Development Building. One of these was a combined pneumatic and mechanical handling experimental plant on which many materials had been successfully tested, including sodium sulphate, cellulose acetate, dolomite, calcined anthracite, coke breeze, heavy soda ash, and polymer.

The second was a coal washing pilot plant employing a magnetic dense medium prepared from blast furnace flue dust. It incorporates a magnetic medium cleaning system, much of which is new and has been developed from investigations on separate small-scale units. The washer, which is fully mechanised to treat up to 20 tons of coal per hour, will be retained as a standard test unit when current investigations are completed.

Then there was a test coke oven plant which was developed some years ago. It can carbonise 10 cwt. of coal and results can be correlated with those of full-scale practice.

Pilot Distillation Plant

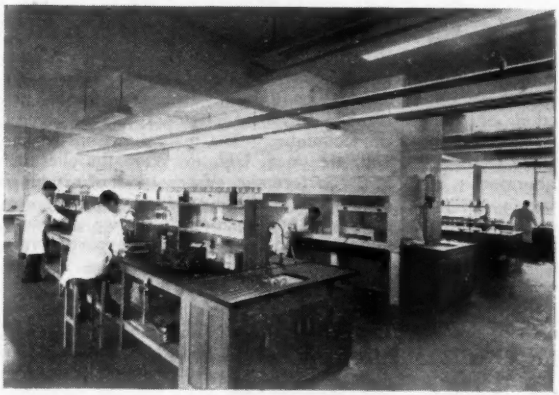
The pilot distillation plant exemplifies the early stages in developing a new process, of which the basic operating characteristics are now being studied on a 100-gallon scale. The fractionating column is of an entirely new design.

Other pieces of equipment which attracted attention were a multi-cyclone assembly which can handle 1,000 cu. ft. per minute of dust-laden gas; a salagraph for the continuous recording of steam purity and a suction pyrometer and associated equipment for measuring high temperature boiler

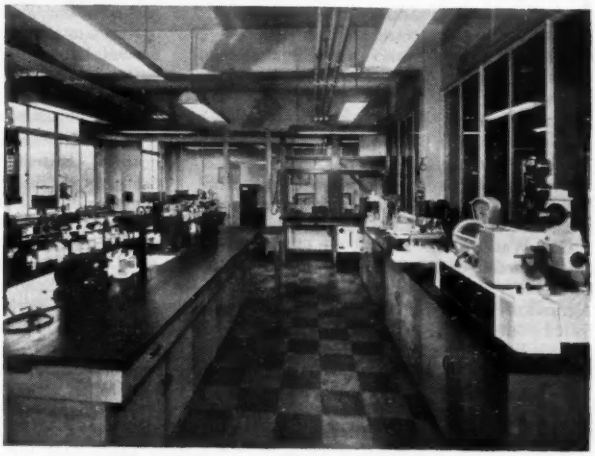
gases using the principle of drawing a gas sample at high velocity over a thermo-couple.

In the metallography laboratory on the second floor a study of welded boiler tubes is being carried out and in one of the research rooms the sedimentation of fluid dust is being investigated. In another, attempts are being made to devise an automatic controller for the saturation of ammonium sulphate solutions. In Room No. 4 determinations of the carbon in iron and steel are being carried out.

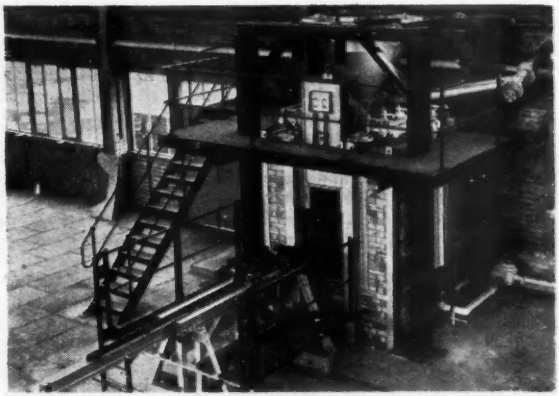
Long-term work, we were informed, is being undertaken on the development of process equipment for sulphuric acid production by the contact process, sulphuric acid recovery and concentration, sulphur recovery, electrostatic precipitation, gas-works ancillary processes and mineral preparation. The development work on mineral preparation is being conducted in London by Huntington, Heberlein & Co., Ltd., a firm recently acquired by Simon-Carves, Ltd., as wholly-owned subsidiary. Some of the experimental work is being done with the co-operation of clients on plants supplied to them and equipment for sulphur recovery and the treatment of phenolic effluents are being developed at gas works. A pilot plant for the recovery of sulphuric acid from spent pickle liquor at steel works



Left: Analytical laboratory for general analytical work on coal by-products, ores, metallic residues, water, acid-resisting materials, etc.



Right: A section of the flour treatment laboratory, in which the performance of new types of machines are checked by analysis of their products, and improved types of flour mill laboratory apparatus are developed



Simon-Carves, test coke oven plant capable of carbonising 10 cwt. of coal

is being developed jointly by Simon-Carves and the British Iron and Steel Research Association with the co-operation of the Steel Company of Wales, Ltd.

In the flour milling side Henry Simon, Ltd., have very fine physical laboratories, a large flour treatment laboratory, a design and development drawing office and a six-floor experimental flour mill. The physical laboratories will work on the mapping of air distribution, the examination of the composition and behaviour of moving streams of particles, dust filtration, etc. Special use is made of optical, photographic and electrical techniques. The main functions of the flour treatment laboratory are the checking of the performance of new types of machines by analysis of their products, the provision of consultant analytical service to flour millers, the development of improved types of flour mill laboratory apparatus, and the provision of a laboratory training service.

The Textile Institute Elects New Fellows

ELECTION of three Fellows and five Associates is announced by the Textile Institute. Those elected to the Fellowship are all Americans who have contributed valuable work to textile chemistry as follows:—

MR. GEORGE S. BUCK, Jr., B.Sc, Washington, D.C., U.S.A., technical director. National Cotton Council of America, and founder of the Cotton Research Clinic, who has published several papers on cotton subjects, and lectured extensively in the U.S.A.

DR. WALTER M. SCOTT, Ph.D., assistant chief, Bureau of Agricultural and Industrial Chemistry, United States Department of Agriculture, Washington, D.C., who has published some seventy treatises, and taken out patents connected with problems of dyeing and chemistry of textile fibres.

DR. EMERY I. VALKO, Ph.D., New Jersey, U.S.A., research consultant to manufacturers of textiles and textile chemicals, who has taken out numerous patents concerned with durable water repellents and treatment of textiles. Dr. Valko is the author of several books and articles, and has given papers on dyeing processes to textile organisations in Britain and the U.S.A.

Associates elected are:—

MR. J. MASON, Manchester, weaving technologist, British Rayon Research Association; MR. S. BROOKE, Oldham, mill planning engineer, Platt Brothers (Sales) Co., Ltd., holder in 1946 and 1947 of the Sons of John Platt Scholarship, and in 1947 of the Mary Alice Clegg Scholarship, and the Platt Token of Respect Scholarship; MR. B. H. THORNLEY, Astley Bridge, Bolton, frame overlooker, Tootal, Broadhurst Lee Co., Ltd.; MR. J. FITTON, M.Sc.Tech., Rochdale, director, Associated Spinners, Ltd., Manchester; MR. M. L. STEAD, Bradford, designer, Hind Robinson & Son, Ltd., Norwood Green, nr. Halifax.

'Power-Gas' Celebrates its Golden Jubilee

IT was perhaps fitting that some of those attending the Golden Jubilee celebrations of the Power-Gas Corporation, Ltd., should get their first pre-view of Stockton-on-Tees by catching a glimpse, through the train window, of the impressive buildings of Ashmore, Benson, Pease & Co., founded in 1873.

After the experiments and inventions of Dr. Ludwig Mond had led to the process of manufacturing a valuable source of heat and power for industrial purposes, the newly-formed corporation acquired in 1901, the older firm, thus bringing together the skill of Stockton craftsmen and some of the finest chemical and gas engineers in the country, as well as fresh finance for the rebuilding of the works and for conducting large-scale business transactions.

The occasion of 50 years' service by the Power-Gas Corporation, Ltd., to the gas and chemical industry was naturally enough one for reviewing some of its past achievements, but it was also aptly made the occasion for showing its confidence in the future by the completion of a new constructional shop—the first stage in a reconstruction programme to be spread over a period of years and costing £2 million. Covering 132,000 sq. ft. floor area together with ancillary services and buildings, the constructional shop of the South Works is founded on 700 Frankipiles each carrying approximately 45 tons.

Laid out for the manufacture of general mild steel, stainless steel, and non-ferrous platework as required by the chemical, gas, oil and iron and steel industries, the works is equipped to deal with plates up to two inches in thickness.

To Operate Shortly

Production is expected to begin at the new works early next month, and on completion it will provide employment for about 400 people.

Although, as its name implies, the original object of the Power-Gas Corporation, Ltd., was connected with gas plant engineering, to-day it supplies plant and equipment for the manufacture, purification and storage of semi and carburetted water gas, producer gas, carbon monoxide, carbon dioxide, hydrogen and other industrial gases. A recent development was the acquisition from the U.S.A. of manufacturing rights in this country of the Wiggins dry gas holder, a model of which was on view.

From its early days the corporation has always been closely connected with the chemical industry and in recent times there has been a growing interest in the production of plant for ammonia and methanol synthesis, industrial crystallisation processes, edible and technical fatty oils production refining and hardening, and calcining lime and dolomite.

Widespread Activities

Dust and fume control and recovery equipment, hydrogen purification plant, and equipment for the petroleum industry are also growing branches of the firm's activities.

The controlling interest was acquired at the beginning of this year in the firm of Rose, Downs & Thompson, Ltd., of Hull, which was established in 1777 and is probably one of the four oldest engineering firms in the United Kingdom. Rosedowns specialises in the manufacture of plant for the extraction and processing of vegetable animal and marine oils, including whale oil plant.

Like most other industrial concerns, the P.GC are having some difficulty with raw materials. The problem of getting what you want, when you want it, is undoubtedly acting as a considerable brake on production.

The outstanding personality at the jubilee luncheon was Mr. Wilfred Beswick, chairman of the corporation, who is shortly retiring after more than 50 years' service. More than any other person he has guided the fortunes of the companies.

Invited to take an appointment with Dr. Ludwig Mond in 1899, Wilfred Beswick was appointed assistant secretary of the Power-Gas Corporation in 1904, and secretary three years later. In 1910 he was appointed general manager and secretary of both the corporation and Ashmore, Benson, Pease & Co., and a director in 1913, becoming chairman in 1939.

Welfare of the workers has always been one of Wilfred Beswick's main concerns. He was a pioneer in the idea of joint consultation and the experiments of the firm, which started in about 1923, laid a foundation upon which the present successful Joint Production Councils are based.

About 200 people were lavishly entertained at the luncheon, which was beautifully laid out in one of the big bays of the new construction shop. Each guest received a pleasant momento of the occasion in the form of a folding magnifying-glass inscribed with the initials P-GC on one side and on the other, Golden Jubilee 1901-1951.

Welcoming the guests, Mr. Wilfred Beswick said: 'I count it a privilege to preside here to-day at this Golden Jubilee of the Power-Gas Corporation for it coincides with my own, and I have great pleasure in giving you a hearty welcome.'

Human 'Catalyst'

'To-day we have tried to gather together an intertwining of our friends with many persons who are concerned with the direction of industry and social life. We have with us both maker and user of plant, both buyer and seller, and others who represent the Church, Law, Finance, the Press, the BBC, and social, civil and industrial life. In many aspects of the civic community I have from time to time played my part, and as I am chairman of the firm, I think I must be a kind of catalyst to synthesise these various elements in our gathering.

'It is true that my day has been lengthened out beyond its full capacity, but as I sometimes wander round the fossil tree in the Harrogate Gardens and remember that it is an archaic and unexpected survival from China of the tree that formed the coal measures untold millions of years ago, I begin to feel that I am still quite a youngster! At any rate, after 65 years of business activities, I am trying to survive these festivities!

'I am the sole survivor to-day of the original group which gathered at The Poplars in London, consisting of Ludwig, Robert Alfred and Emile Mond, with whom I spent nearly two years, and I seem to have been saddled with several jobs that others had to let go.

'All the family concerns here represented —including our latest friends, Rose, Downs & Thompson, Ltd.—have been developed in an atmosphere of friendship, trust and achievement, and, within our own organisation and outside it, we have proved this to be a good environment in which to build.

'We recall with pleasure the many friends of the past and present who have helped us to develop our trade. Many of these friends are here, some of whom are from overseas, and it makes my duty extremely pleasant to offer you on behalf of the directors of The Power-Gas Corporation a very hearty welcome'.

Proposing the toast of the Power-Gas Corporation, Dr. Alexander Fleck, deputy-chairman, Imperial Chemical Industries, Ltd., paid a tribute to the services the firm had rendered to industry over 50 years, both at home and abroad. He also referred to some of the founder directors—Dr. Ludwig Mond, John Brock, chairman of the United Alkali Co., Ltd., and Sir George Beilby, director of the Cassel Cyanide Co. and the Castner Kellner Alkali Co., Ltd.—who had planted the seed from which the business had prospered.

The steady progress of the firm, continued Dr. Fleck, had been based on the study and application of the best scientific principles and technology which were being upheld to-day to the very highest level. The new building would prove to be not only a continuation of the great work done in the past, but the basis of greater prosperity and business in the future.

Dr. Niels E. Rambush, vice-chairman and managing director of P-GC, responded to the toast. The doctor, whose influence has been felt in every department of the organisation for 33 years, has made an excellent leader to a willing team. He is a well-known authority on gas production on which he wrote a book in 1923. A number of patents held by the firm were originated by him.

Confidence in the Future

Integrity and straightforward dealings had played a large part in preparing the foundations of the firm in the past, said Dr. Rambush. He felt confident, however, that the present and future members of the corporation could be relied on to live up to the high standards set by Mr. Beswick and other early members of the company.

Looking back, the company was proud to have been entrusted with the design and manufacture of the semi-water gas plant at the Billingham works of I.C.I., which plant

produces about 80 million cu. ft. of gas a day to meet the basic needs of one of the world's largest chemical factories.

Manufacture of plant for the chemical industry covered so wide a field that it was difficult, continued the doctor, to describe adequately the firm's varying activities.

Over 1,000 men were at present engaged on various sites in this country erecting chemical plant of one kind or another and 4,000 men were similarly engaged overseas. On behalf of the Government of India, the company had co-ordinated and were supervising the erection of an American design of a large fertiliser manufacturing plant at Sindri, near Calcutta. In a few months time this factory should be producing a thousand tons of fertiliser per day.

In addition to organising the erection of this entire factory P-GC had designed and manufactured the 33 million cu. ft. per day gas plant which would supply the nitrogen and hydrogen needed for the manufacture of the ammonia.

Research in its recently equipped laboratories would be continued and increased. No firm in the plant manufacturing industry could hold its ground unless research both on processes and on plant manufacture was aggressively pursued.

Special Designs

The old established practice of designing plant to meet the specific requirements of clients was being extended. The presence of everyone gathered together in the new factory was evidence of the firm's policy on the manufacturing side. The bay in which they were sitting was one of six in the first stage of construction of a new steel fabricating shop. The site layout would permit an increase by four times in the floor area of this shop.

'Our guests' was proposed by Major W. Reid Brown, D.S.O., who was appointed to the board of Ashmore, Benson, Pease & Co., Ltd., in 1942, and two years later to the board of the corporation. The major said in proposing the toast he knew he was sure of the support of all his colleagues. Nevertheless he would try to steer a course between the sandbanks of understatement and the rocks of unseemly boastfulness, and he would be sincere and, he hoped, brief.

When they had occasion to celebrate, the P-GC was only too pleased to gather its friends around it and it was delighted to welcome representatives of the administrative, cultural and industrial aspects of the town in which the firm had grown up and lived. It was regretted that many overseas friends were not able to attend, but those who were present were all the more welcome.

Notes of what he had to say lay in ambush among the empty glasses before him, but he would be content with saying that the day would be a red letter one in the memory of the hosts, and he hoped that the guests would also carry away a pleasant recollection of their all too brief visit.

American Friendship

Strong ties united the P-GC with America and it therefore gave him great pleasure to associate the toast with the name of one who hailed from the U.S.A.—Mr. Oliver Smalley, president of the Meehanite Metal Corporation, New York, under which production of iron castings in the U.K. had recently been developed by the P-GC.

In response Mr. Smalley said that the world to-day was overwhelmed by too many '-isms', but although the common man of the world might be confused in his thoughts, and worried about what was going to happen to his way of life, he did not believe that he wanted to be taken care of by the Government from the cradle to the grave. It was private enterprise that had given America the highest standard of living in the world.

Celebrations of the Golden Jubilee were continued on Saturday, 14 July, when employees of the Power-Gas Corporation, Ltd., together with their wives, children, sweethearts, friends and relations, totalling some 5,000 in all, were entertained to luncheon and the delights of swings, roundabout, fun fairs, donkey-rides and other pleasures.

Mond Nickel Increases

The rate of nickel production planned for the end of this year by the International Nickel Company has already been reached, announce the company. This level of production has been achieved in the very short space of time of three months, instead of the proposed eight that was estimated at the annual meeting in April. The production level is now nearly 10,000 tons of nickel per month, an increase over the previous rate of 4,500 tons a month, due to the installation of emergency production facilities.

Rayon Industry & Sulphur Shortage

Extension of Acid Plants

PROBLEMS caused by the raw materials situation and the effects of shortages—particularly of sulphur—are referred to in his survey of the year ended 31 March, 1951, by the chairman, Sir John Hanbury-Williams to be presented at the 38th annual general meeting of Courtaulds, Ltd., to be held in the Hall of the Chartered Insurance Institute, London, E.C.2, on Wednesday, 25 July, 1951.

Future supply of raw materials was one of the company's major concerns at the present time both from the point of view of availability and price. Prices, which had appeared to be settling to a steadier level in 1949, have since then risen rapidly with no limit apparently yet in sight. Wood pulp, one of the most important raw materials used in the production of rayon, had in some cases risen as much as 120 per cent above the grades supplied in June, 1950.

It was not only, however, that raw materials had become more expensive, but they had proved more difficult to obtain; in some of them, particularly in the case of woodpulp, there was a world shortage in relation to current demand for all the different uses.

Essential Raw Material

Sulphur, about which there had been so much publicity, was an essential raw material in the manufacture of viscose rayon as a constituent of sulphuric acid and carbon bisulphide. In past years all the requirements of the latter had been produced in its own factories, but the company had made only a proportion of the sulphuric acid it needed, buying the remainder from outside suppliers.

Since the war there had been a general reluctance on the part of sulphuric acid manufacturers to increase their capacity to meet all the growing needs of the consumers. This was no doubt mainly due to the price control of sulphuric acid, which was fixed at a level that made it unremunerative to build plants for the production of acid from pyrites or other sulphur-bearing materials.

In consequence the company had been forced to enlarge its own acid production to cope with the expansion of rayon output and also to replace former acid purchases. Extensions to their sulphuric acid plants at Trafford Park, near Manchester, besides the erection of new plants at Greenfield, in North Wales, and at Carrickfergus in Northern Ireland, had been carried out and were already contributing to meet the situation, but further capacity was needed and the necessary plans were in hand.

Further Capacity Planned

Acid plants so far brought into production were, in fact, designed for the use of elemental sulphur, since they were erected before the shortage of sulphur became acute. When, however, in 1950, a serious cut in supplies of sulphur from the U.S.A. began to appear likely, it was decided that not only would it be necessary to convert some of the plants to use pyrites, but that the further acid-producing capacity required would—in spite of the greater capital expenditure—have to be based on the use of pyrites, because this raw material exists in much larger quantities and in many parts of the world.

The extent of the cut in sulphur supplies from the United States of America had been a severe blow to the British rayon industry, because apart from the deposits in Sicily the only large-scale sources of elemental sulphur in the world at present being worked were located in Texas and Louisiana.

The United Sulphuric Acid Corporation, a company now being organised for the purpose of producing sulphuric acid from anhydrite, a sulphur-bearing mineral found in large quantities in this country had now been formed.

Some eleven companies which were consumers of sulphuric acid, including Courtaulds, Ltd., had joined in this co-operative undertaking and plans were being worked out for the construction and equipment of a chemical works (probably to be sited in the north-west of England) and for the requisite financing.

Research and development work had been greatly intensified within the organisation. Considerable sums of money were being expended annually in this way, with the object not only of keeping in the forefront of technological advances in the textile industry but also for the purpose of improving the various properties of existing types of rayon, as well as exploring the possibilities of new kinds of synthetic fibres.

The British Association at Edinburgh

Progress of Chemistry Reviewed

THE British Association for the Advancement of Science has chosen the ancient city of Edinburgh for its 113th Annual Meeting this year, from 8-15 August. Over 300 papers will be read at this meeting, covering thirteen different sections, and taking in all some 250 hours to deliver (1,500,000 words).

The British Association was founded in 1831, and meetings have been held every year since then except during the two wars. Edinburgh has already been host to the association on five previous occasions and this year the association has the great honour of having H.R.H. The Duke of Edinburgh, K.G., F.R.S., as President. This is the third time in the history of the association that a member of the Royal Family has held the office. H.R.H. The Prince Consort was president in 1859, when the annual meeting was held at Aberdeen, and the Duke of Windsor (then Prince of Wales), in 1926, that meeting being held at Oxford.

On the evening of the first day of the meeting the Duke of Edinburgh will receive the honorary degree of Doctor of Laws from the University of Edinburgh and he will later deliver his presidential address on 'The British Contribution to Science and Technology in the Past Hundred Years'.

The programme of the meeting bears on its cover the symbol of the Festival of Britain in token of the fact that the 1951 meeting of the association is a part of the Festival. The annual meeting is the principal public forum in Britain for the presentation and discussion of progress in science, and it is appropriate that the programme in 1951 should contain reviews of the progress of British science during the past 100 years.

Thirty Critical Reviews

This has been done, however, without substantial alteration to the normal character of the programme, which aims to present current topics of interest and importance. Some thirty critical reviews of a century of progress are scheduled for delivery before the meeting ends.

The programme includes papers by 180 university speakers, 20 industrial, and 65 from Government establishments. The presidential address of the Chemistry Section will be given by Sir Cyril Hinshelwood, Foreign Secretary, Royal Society, speaking on 'Chemistry at the Mid-Century'. Professor F. A. Paneth, F.R.S., will also speak, on 'The Trend of Inorganic and Physical Chemistry since 1850', and Professor A. R. Todd, F.R.S., will read a paper on 'Developments in Organic Chemistry during the past 100 years'. Some general aspects of the changing face of chemical industry will be presented on Friday, 10 August, and Monday, 13 August, will be devoted to papers on organic chemistry in the service of medicine. On Tuesday, the day before the meeting ends, the subject will be metals and alloys.

Excursions into the Country

The programme also includes 180 excursions and visits to various parts of the countryside, places of interest, and works in the neighbourhood. These are described in a special booklet brought out for the occasion. Visits by the Chemistry Section include one to I.C.I. (Dyestuffs Division) at Grangemouth, one to British Petroleum Chemicals, Ltd., also at Grangemouth, to see its cracking plant, and one to Scottish Oils, Ltd., Pumpherston Refinery, West Lothian.

In addition to the presidential address and the meetings of sections there will also be a conference of delegates from scientific societies in the provinces and three evening discourses. These discourses will be delivered in the Usher Hall, and will be on 'Alchemy and Alchemists' by Professor John Read, 'Natural Science and the spiritual Life' by the Very Reverend John Baillie, and 'The Contemplative Gardener' by Sir Edward Salisbury.

A unique feature of the Edinburgh meeting will be the transmission of the Graduation Ceremony and inaugural meeting by television from the University's McEwan Hall to the City's Usher Hall on the evening of 8 August.

Where overflow meetings have been necessary in the past the proceedings have been relayed by public address equipment. This year a large audience, unable to be accommodated at the McEwan Hall, will be able to see the proceedings on a screen 16 ft. by 12 ft.

Scarce Metals from Waste

Some American Methods

THE general scarcity of every strategic metal from uranium to manganese naturally puts the question of recovery from waste into the forefront of importance. Even America herself cannot afford to ignore the millions of dollars' worth of valuable materials that formerly went down the drain each year, and an article in *Chemical Engineering* of June, 1951, gives a survey of some of the processes whereby she is reclaiming significant quantities of metals from previously discarded wastes—flue dusts, mining residues, soot deposits and process liquors—even though recovery direct from the original ores would be impracticable.

Uranium from Gold

Uranium, for example, has been found in nearly all the South African gold ores, and the Union has promised to sell her entire output of recovered uranium to the U.S. and Britain. Four recovery plants are planned, and production is expected to begin in about 2½ years—using both old waste dumps and fresh ores.

During the last war, many of the huge slag dumps that accumulated round steel mills were combed for the large amounts of iron that sometimes escape when the molten slag is run off. One company recovered 150,000 tons of scrap iron in one year from this source, and various dumps of low-grade ore —previously ignored—are now being beneficiated by various means to increase the iron content. The Bureau of Mines is at the moment carrying out a plan to reclaim 300,000 tons of manganese a year from slag —almost half America's annual imports of the metal. A similar extraction from low-grade domestic manganese ores is also reported, using flotation processes.

90 Per Cent Recovery

Flotation was also used during the war for processing large accumulations of fluorite 'tailings' and waste rock, with a recovery rate of fluorite of as high as 90 per cent. A somewhat older application of flotation has also been used to reclaim cobalt, tungsten and chromium from grinding wheel sludges, and lead, zinc and gold have been reclaimed by flotation.

Slag fuming is also used to recover lead and zinc from waste piles. The desired metal is boiled up or 'fumed' from the surface of a furnace-load of molten slag. The vapour is then converted to metallic oxides and cooled to a solid or a powder for further processing into the pure metal. There are three such installations in North America now. The latest is for an 800,000-ton accumulation of residue estimated to contain 26 per cent of zinc.

Roasting of ore concentrates containing trace elements can also be used to enrich the material. Molybdenite ore, the richest source of rhenium—a metal similar to tungsten both in properties and applications, and coming increasingly into use—contains 0.6-0.7 per cent molybdenum, but only 0.0001-0.05 per cent rhenium. Flue dusts from roasting the ore, however, contain up to several per cent of rhenium, and these are the present source of supply.

Germanium is obtained in a similar fashion, from the flue dusts in zinc ore smelters. This metal is invaluable in the electronic industry for producing ultra-high frequency or micro-wave currents, and in the new transistors which perform many of the functions of conventional vacuum tubes. It is expected that in time the most important source of this metal will be from the flue dusts and ashes resulting from the burning of coal containing germanium.

Cadmium Dusts Exhausted

Flue dust was an important source of cadmium during the last war, but these reserves have now been exhausted and the main source is now as a by-product from the refinement of cadmium-bearing zinc or lead ores. Vanadium, too, has been found in flue deposits from burning oils—such as those in Venezuela—to a certain extent, and boiler scale in ships using Venezuelan crudes also contains usable amounts of the metal which is sometimes recoverable.

It is clear from this more economical attitude towards these raw materials that is now being taken up in the world, that the old carefree days, when uses for the rare metals were just being discovered, are over. Our aim must now be to obtain as near to 100 per cent extraction and salvage as we possibly can, using all sources available.

Dermatitis from Formaldehyde

Investigation of Factors Responsible

THE widespread use of synthetic resin adhesives, particularly in the aircraft industry, has been attended by new problems, possibly the most serious being the development of dermatitis by those who handle the glues. The incidence of the trouble was so high in certain cases as to necessitate the use of a glue of lower durability. It has been asserted that certain phenolic glues, which from laboratory tests might be expected to give the highest performance in service, are more troublesome than the urea-based adhesives. In order to facilitate the choice of adhesives, it is therefore necessary to reduce the incidence of dermatitis.

For the purpose of obtaining data on the incidence and causes of the affection a number of firms were approached by the Ministry of Aircraft Production. It was generally agreed that dermatitis could arise through the hardening of the glue on the skin or the action of the vapour of formaldehyde. Experiments were accordingly carried out for the purpose of correlating the proportions of formaldehyde in a glue and the surrounding air with its dermatitis properties, in order to deduce, if possible, which of the two causes of dermatitis was paramount. This investigation has been described by G. E. Little, Department of Scientific and Industrial Research, whose report is included in '*Selected Government Research Reports*, Vol. 7, Adhesives', published for the Technical Information and Documents Unit of the Board of Trade by HMSO.

Two Methods Used

Gravimetric and colorimetric methods were used to determine the formaldehyde content of selected synthetic resin glues. Dimedone (dihydrodimethyl resorcinol) reacts quantitatively with formaldehyde to yield methylene *bis*-dihydrodimethyl resorcinol. This reaction was used in the determination of the formaldehyde content of certain phenolic resin and resin-hardener mixes. The method was not applicable to urea resins which, being water soluble, could not easily be removed by precipitation.

It has been shown that when a solution of formaldehyde phenylhydrazone is treated with potassium ferricyanide and hydrochloric acid a deep red coloration develops. The intensity of the colour can be used to determine the amount of formaldehyde either by comparison with a set of standards, or alternatively by means of a photoelectric cell. The test is sensitive and can be used for the estimation of the amount of formaldehyde in the air, for which purpose it was primarily used in this investigation. In addition, however, it was applied to the determination of the formaldehyde content of the resins themselves. As with the dimedone method it was necessary to precipitate the phenolic resins, but the remaining resins, being water soluble, were not so treated. Fairly good agreement between the two methods was obtained.

Concentration Determination

The concentration of formaldehyde in the air in proximity to the glue was determined by an apparatus consisting of a container for the glue, a desiccator maintained at 25°C., and a device for withdrawing samples of air in order to determine the formaldehyde content. It was possible to stir either the glue or the air above it, but not both.

With no hardener present a sample of resin, approximately ½ lb. in weight, was contained in the desiccator. The glue was stirred for 1¼-1½ hours at about 70-90 r.p.m. Samples of the air in the desiccator were then withdrawn and analysed, while stirring continued. The figures obtained showed that the formaldehyde concentration in the air was a function of that of the glue. Similar experiments were carried out with the same resins in the presence of a hardener. In order to afford a better comparison between the resin and resin-hardener mixes, the air above the glue was stirred in a third series of experiments, but not the glue.

The formaldehyde content of the resins ranged from zero in the case of resorcinol resins to 5½ and 6 per cent for a phenolic resin. There was no distinction between the urea and phenolic resins with respect to formaldehyde content. The investigation showed that the formaldehyde content of the air in proximity to the glue is related to the formaldehyde content of the resin and does not depend on whether this is of the urea or phenolic type. No evidence was obtained from the experiments on urea and phenolic

resins that any marked evolution of formaldehyde occurs on mixing with hardener. In certain cases a small increase in the formaldehyde content of the glue occurs; in others there is a slight increase in the formaldehyde content of the air in proximity to the glue. Heating of the resin during setting also gives rise to higher formaldehyde concentrations in the air. The resorcinol resins when treated with hardener are associated with increasing concentrations of formaldehyde, both in the glue and in the surrounding air.

Three Probable Causes

A certain amount of data was available as to the incidence of dermatitis from the use of a number of the glues examined. In the light of the somewhat scanty evidence available, it was concluded that the three probable causes of the affection were: (1) the action of formaldehyde vapour; (2) the hardening of the glue on the skin (followed by (a) the irritant action of formaldehyde, phenol or phenolic alcohols, and (b) the forcible removal of layers of glue with damage to the skin and consequent vulnerability to infection); and (3) the use of organic solvents as cleansing agents.

Although organic solvents have dermatitic properties, their use as cleansing agents is restricted and they cannot be considered as the primary cause of the affection.

A small number of people are potentially allergic to formaldehyde vapour, and even though they do not handle glues they will be affected. From evidence available it would appear that the number of such persons should not exceed 5 per 100. When an outbreak of dermatitis affects half or even more of the workers, there is reason for believing that the primary cause is the hardening of the glue on the skin and not formaldehyde in the atmosphere.

Hot-press glues are usually associated with high concentrations of formaldehyde vapour, yet are seldom troublesome. Glues used in this operation are slow-setting and in general more water-soluble than the cold-setting variety. Consequently the probability of the glue hardening on the skin is small.

Of two firms using the same urea resin, one reported little dermatitis while another was forced to abandon its use. The investigators concluded that only lack of cleanliness could have been responsible in the latter case, hardening of the glue on the skin causing the affection. Significantly, formaldehyde was used by this firm in other operations; the vapour concentration was high, yet no case of dermatitis occurred.

Theoretically the use of barrier creams and high standards of cleanliness will reduce the incidence of dermatitis to the few cases of allergy, but this objective is not easily attained in practice because of the human element. Both causes of the trouble would tend to be eliminated by the development of water-soluble glues with a low formaldehyde content.

Deposition of Brass

Electrolysis in an Oxalate Bath

CO-DEPOSITION of copper and zinc on base metals is a development in electroplating practice which can be satisfactorily carried out with the aid of a solution containing a complex oxalate and free from cyanide. According to A. I. Stabrovsky (*J. Applied Chem. Russia*, May, 1951, 471) a suitable bath can be prepared by reacting solutions of copper sulphate and zinc sulphate with sodium oxalate, and the complex formed in this manner is believed to be a mixture of $Na_2Cu(C_2O_4)_2.2H_2O$ and $Na_4Zn(C_2O_4)_3.xH_2O$. Operating with a current density of 0.1-0.3 amp./sq. dm., the deposits have a zinc content of 66.6 to 71.5 per cent and suffer from the defects of friability and dark colour, even when a buffering agent in the shape of boric acid is present. Further experiments revealed the suitability of gelatine (0.1 gm. per litre) as an additive to correct these defects. This measure also resulted in an increase in the copper content of the cathodic deposits from 29.8 to 63.4 per cent (at 0.2 amp./sq. dm.).

Apart from being less poisonous than cyanide, the oxalate bath is more stable in the atmosphere, while its throwing power is comparable with that of cyanide when measured by the method of Haring and Blum (*Trans. Am. Electrochem. Soc.*, 1923, *44*, 313). The potential of the brass coatings is more electronegative than the standard potential of iron, so that good corrosion protection may be expected. It is stated that the plating forms a good surface on steel articles that are to be subsequently coated with rubber.

The optimum composition of the bath in grams per litre is given as: $CuSO_4.5H_2O$—2.5; $ZnSO_4.7H_2O$—4.5; $Na_2C_2O_4$—26.0; H_2BO_3—20.0; and gelatine—0.1.

Chemical Engineering Research

Work of British Hydromechanics

OF great value to the chemical and petroleum industries is much of the work of the British Hydromechanics Research Association. This organisation was formed in 1947 to meet the need for collective research in fluid mechanics. Its membership is drawn largely from pump and turbine manufacturers, but support has also been forthcoming from several leading oil and chemical firms.

Due to the very limited funds available on its formation, the association decided to concentrate initially on the development of its technical information service, which includes the publication of a bulletin of abstracts every other month, the translation of important foreign papers, and replies to queries from members and Government departments.

Meanwhile an exploratory committee was appointed to evolve a research programme. The field is extremely wide, but an lysis showed that the many problems requiring investigation could be divided into six groups. Six committees, each dealing with a specific group of problems, were therefore appointed to advise the Director of Research, Mr. L. E. Prosser, A.K.C., B.Sc., M.I.Mech.E.

It soon became evident that in order to develop an efficient organisation experimental facilities were required. Despite its modest financial resources, the association therefore acquired the lease of suitable buildings at Harlow, Essex, where a hydraulics laboratory has been established. On 24 May, 1951, this laboratory was opened by the Rt. Hon. Sir John Anderson, G.C.B., G.C.S.I., G.C.I.E.

The Oil Laboratory

The building consists mainly of one large rectangular area having a gallery across one end at a height of 12 ft. 3 in. above the ground floor. This arrangement provides sufficient vertical space for work requiring suction lifts. The oil laboratory occupies a portion of the main laboratory block and contains an oil sump with a capacity of 985 gallons. The flooring consists of oil-resistant asphalt tiles. An instrument laboratory, photographic laboratory and cavitation laboratory are housed in a double-storey office block.

In equipping the laboratories the general policy was not to lay down elaborate pieces of permanent equipment, but to restrict the permanent features to the bare essentials of a small pumping and metering system, a workshop and darkroom, etc. The remaining equipment has been made as flexible as possible to suit whatever requirements may arise. The main laboratory has been provided with a sump channel 53 ft. 3 in. long by 4 ft. wide by 4 in. deep, below floor level, which is connected to a well 12 ft. deep. The final set-up will include three pump test rigs of various capacities, which will feed into a main header tank through an 8 in. main.

Pipe Friction Losses

The estimation of pipe friction losses is of importance in both chemical and petroleum engineering, not only because of the cost of the pipe but also because an inaccurate estimate may result in pumps or other components operating away from their designed duty with a consequent loss of efficiency. Whichever of the dozens of friction formulae is favoured, there will always be within it, apparent or otherwise, a friction coefficient whose value must vary both with Reynolds Number and the roughness of the pipe walls. The former can be calculated, but the roughness can only be determined by previous experience or measurement. The association has examined much published experimental work with the object of summarising previous experience in simple formulae. Two papers giving the conclusions reached were delivered recently to the Institution of Mechanical Engineers.

Although formulae for particular classes of pipe may be sufficiently near for general use, there remains the problem of measuring the roughness of unspecified pipes. It has not so far proved possible to correlate the hydraulic roughness with any form of mechanical roughness measurement, so that friction loss measurements have had to be made on actual pipe lines. This is not always practicable, especially for large sizes. The association has been looking into the possibility of devising a simpler form of

measuring hydraulic roughness, and tests have been started with a simple instrument designed to clamp on the inside wall of the pipe, so that the actual pipe wall forms approximately one-half of a flat passage. The effect is to increase considerably the relative roughness of the passage, thus giving a large increase in measurable friction and permitting the tests to be made at a much lower Reynolds Number (and consequent small flow), while still maintaining fully developed rough flow.

Commercial Flow Meters

The normal accuracy of commercial flow meters is sometimes vitiated by the presence of pulsations in the flow; for example, in the delivery of reciprocating pumps. Little is known about this effect, and the association has therefore started experimental work, both to determine the true discharge coefficients of orifice or venturi type meters under rapidly varying flow, and also to study the behaviour of the manometer under conditions of varying differential and absolute pressures.

An apparatus has been designed to superimpose a fluctuation of adjustable amplitude and frequency on an otherwise steady flow through a pipe containing the orifice plate. The flow is obtained by discharge over a weir into a relatively large elevated cylindrical vessel to which the pipe is connected. A reciprocating plunger is in communication with the pipe at about its midpoint. The resistance and inertia of each half of the pipe are roughly equal, so that approximately half the displacement of each stroke of the plunger will manifest itself as an increase or decrease in the flow through the orifice. This can be checked by measuring the cyclical variations in level in the tank.

The flow through 'rotodynamic' machines is extremely complex and imperfectly understood. Present methods of designing pumps to meet given conditions have been developed by evolution based on long practical experience, and it is unlikely that detailed laboratory experiments will result in any rapid improvements. A background of complete understanding of the actual behaviour of existing designs is a primary requirement before progress can be made with theory and design methods.

Designs similar to those evolved by the California Institute of Technology, using transparent materials and extensive instrumentation, are being considered by the association, but little material progress has yet been made. A simple apparatus using a transparent impeller, however, has been made to try out methods of flow visualisation, such as high speed flash photography.

Pressure surges in pipe lines are a problem with which the petroleum industry is much concerned. When a pump is started with an empty delivery pipe, heavy surges may result when the advancing fluid column is arrested by a partially open valve. Tests have been carried out on a borehole pump fitted with a 4 in., 60 ft. rising main. Orifices of varying apertures were fitted at the top end of the pipe and the resulting pressure surges were measured with an electronic recorder. High surge pressures up to 350 lb./sq. in. have been recorded.

The association is co-operating in experiments at the Battersea Polytechnic for the development of a method of making model tests on complicated pipe systems. Owing to the very high frequencies associated with the short lengths of pipe involved, electronic instrumentation has been employed, a specially designed quick-acting valve being used to initiate the surges.

An example of the importance of preventing excessive pressure surges occurs in the case of flexible hoses for loading oil tankers, where a burst pipe might flood the decks, or the docks, with highly inflammable petrol.

Full-Scale Tests

A graphical calculation shows that the presence of a flexible pipe in the circuit does not always reduce surge pressure as much as is sometimes assumed. Full-scale tests in collaboration with an oil company are to be carried out shortly to check this conclusion and provide reliable data on the behaviour of armoured flexible hoses in this connection.

The cost of many hydraulic machines could be reduced if higher speeds were practicable. The limiting factor is generally the onset of cavitation, caused by the low absolute pressures resulting from the high fluid velocities. Considerable uncertainty exists regarding the physical nature of cavitation, some theories being based on the mechanical forces arising from the collapsing bubbles and others on the electro-chemical effects associated with the tensile fracture of liquid molecules.

An investigation of the fundamentals of cavitation has been started on behalf of the association by Mark Laboratories, Keston, who have developed a magneto-striction apparatus for this work. A nickel tube about 10 in. long is subjected to a D.C. polarising magnetic field and to an A.C. magnetic field, which vibrate the tube at its natural frequency of about 8,000 c/s. At the lower end of the tube one or two specimens are attached and can dip into small quantities of liquid. The vibration subjects the specimen to accelerations of about 10,000g., which are sufficient to cause severe cavitation.

The theory under investigation is based largely on an apparent similarity between cavitation-erosion and corrosion-fatigue. It is known that the life at any particular fatigue limit is greatly reduced if the test is carried out in a corrosive medium, while the fatigue limit itself is also reduced in a corrosive medium. If the corrosion is prevented, for instance, by cathodic protection, the fatigue limit is increased up to that of an air test. In the case of cavitation it is known that the rate of erosion in non-corrosive liquids such as alcohol or transformer oil is considerably less than that in water, while the erosion in a water test can be reduced and perhaps prevented by cathodic protection. The suggestion, therefore, is that in the initial stages of cavitation in water the metal is being corroded, and only after the surface layer has been weakened will the full cavitation-erosion rate take place.

Prevention of Leakage

Also of importance to the chemical industry is the prevention of leakage between moving surfaces. In many cases the sealing problem is ultimately one of lubrication, since if there is to be no leakage, lubrication of the sliding faces is poor and overheating is likely. To prevent egress of fluid the surfaces must press on each other with a stress in excess of the fluid pressure, and in many designs of seal one of the parts is of a deformable material, but such materials do not make good bearing surfaces.

Test rigs have been built for examining both modifications to existing seals and promising new designs, under conditions similar to those obtaining in industrial practice. Preliminary experiments on stuffing-box glands have shown that the power absorbed and the amount of leakage are interdependent and are influenced by the tightness of the gland. Some tests on rubber lip-seals have revealed that after modification these seals can accommodate large amounts of whip and misalignment in the shaft. In one test a 2 in. shaft whipping by 0.025 in. was completely sealed up to speeds of 3,000 r.p.m. for long periods. Besides these experiments on actual seals, the fundamentals of friction and lubrication of seals have been studied, mainly with reference to rubber and similar materials.

In this investigation special attention is being paid to the initial stages of cavitation attack, a very sensitive calorimetric method being employed to measure the relative amounts of corrosion and erosion products.

Collaboration Hoped For

A factor which increased the initial difficulty of obtaining adequate financial support for the association, but which in the long run should be a source of stability, is the diversity of industries having technical interests in fluid mechanics. It is hoped that close collaboration with the chemical industry can be achieved. The association can assist chemical manufacturers by direct advice or research and development on problems of fluid mechanics, and also by improving the performance of the more or less standard hydraulic equipment purchased by the industry.

It is not generally realised how much mechanical energy costs, both in direct capital and in running. A recent survey by an industrial firm showed that it was economic to spend up to £200 additional capital to save 1 h.p. in a continuously running plant. Badly designed or utilised hydraulic plant can waste enormous amounts of energy.

Given the necessary support, the association could give more attention to the particular types of problems most frequently encountered in the chemical industry. Fluidisation, for example, is a subject which has been discussed at considerable length, ever since it was discovered that the Germans had done much work on this flow problem during the war. The behaviour of water drops and the air flow distribution in cooling towers or separation plant is but one of the many problems in chemical engineering which need further study. The association has already been able to help in a number of such problems, but before it can do really important work in this field, its staff and activities will have to be expanded.

HOME

Zinc and Lead Prices Raised

Increased prices for zinc and soft imported lead were announced by the Ministry of Materials as from 14 July. Good ordinary brand zinc was raised by £30 from £160 to £190 per ton. Imported good soft pig lead rose by £20 from £160 to £180 per ton. Both new quotations were delivered to the consumers' works. The last change in U.K. prices was on 2 April when lead increased by £24 and zinc by £9.

Steel Works Opened

The steelworks of the Steel Company of Wales at Margam, Port Talbot, were officially opened on 17 July. The largest steel mill in Europe, it will produce 1¼ million tons of sheet metal and strip annually. About 350,000 tons of strip will go to Trostre, Llanelly, for manufacture into tinplate. Over 14,000 tons of steel have been rolled since the works started operating some five weeks ago.

Premises Re-occupied

As from Monday, 23 July, Innoxa (England), Ltd., and associated companies, will be resuming occupation of its pre-war premises, 1 Eden Street, Hampstead Road, London, N.W.1. Repairs to the building, which was damaged by enemy action, have now been completed. The administrative, general sales and order offices will be at this address (Telephone: Euston 8575-9; Telegraphic address: Alberdrug Norwest London), while the purchasing and works offices will remain at 233 Balls Pond Road, N.1.

Self-Improvement Encouraged

The Scottish paper manufacturers, G. and J. Weir, Ltd., are launching a scheme to encourage workers to make the fullest use of the technical educational facilities in the area. All who enrol in appropriate technical institutions and are accepted will have their entrance fee and annual subscription paid by the firm.

As a further inducement to employees to qualify for membership of such institutions the firm has offered an award of £20 to any member, of not less than three years' continuous service, who qualifies and is accepted as an associated member of one of the appropriate professional bodies associated with their industry.

Wolfram Cheaper

Quotations for wolfram on 16 July were 525s. to 535s. nominal per unit c.i.f., compared with 525s. to 545s. previously.

Industrial Radiology Meeting

The summer meeting and exhibition of the Industrial Radiology Group of the Institute of Physics will be held at the Institute's house, 47 Belgrave Square, London, S.W.1, from Monday next (23 July) until Wednesday, 25 July.

On the opening day, 'An Analysis of the Quality of Radiographs' will be given by Mr. D. Bromley, Admiralty Materials Laboratory, Poole, followed by a discussion, and Mr. J. Rhodes, Royal Ordnance Factory, Woolwich, will read a paper on 'Gamma-ray Stereography.'

Acetylene Association's Jubilee

THE Jubilee of the British Acetylene Association was celebrated in London by a series of meetings and functions from 12-14 July, when the association acted as host to La Commission Permanente Internationale de L'Acétylène. About 40 delegates representing 11 European countries and the U.S.A. attended.

In its early day the association played an important part in framing regulations for safety in transport, storage, and use of carbide, and the apparatus for generating and applying acetylene. It also assisted in the development of oxy-acetylene welding and was instrumental in founding the first welding schools throughout the country.

A number of technical papers were read and discussed following a general introduction by F. Newport, M.B.E.

Properties and handling of liquid acetylene were described by A. M. Clark, B.A., B.Sc., and the handling of acetylene under pressure in chemical reactions was the subject of a paper by S. A. Miller, M.A., B.Sc., Ph.D.

The final paper by J. W. Woolcock, B.A., B.Sc., D.Ph., was a review of the processes for production of acetylene from hydrocarbons.

OVERSEAS

Austria Exporting Lithopone

The lithopone unit of the Bleiberg Mining Union which started production a year ago at Arnoldstein, Carynthia, British zone of Austria, is reported to be meeting the country's total requirements. In addition, approximately 200 metric tons are being exported every month.

Indo-Swiss Trade

A recently signed extension of the current trade agreement between India and Switzerland for another ten months (i.e., until the end of the current year), provides for the shipment of Swiss chemical goods valued at 14,100,000 Swiss francs.

Research on Sulphur Bacteria

The Australian Commonwealth Scientific and Industrial Research Organisation is reported to be studying the results of work on sulphur-producing bacteria, initiated in this country by DSIR, with a view to starting similar work in Australia.

New Sulphuric Acid Works for Poland

Reports just to hand from Poland indicate that a large sulphuric acid plant started operations on June 1 at Wizow. This is described as the second great project of the Six Year Plan to be put into operation, the first having been the Czenstochowa steel mills. No figures pertaining to the new plant's capacity and output are available, but it is stated that it is the first works in Poland to produce sulphuric acid from anhydrite and in fact the fourth plant of its kind in the world.

Molybdenum Export Quota

An export quota of 1,700,000 lb. of molybdenum for the third quarter of 1951 has been announced by the American Commerce Department.

The Commerce Department gave no country-by-country breakdown of the figures. It said 1,500,000 lb. might be exported in the forms of ores and concentrates. Actual shipments of supplies must be authorised by the Defence Minerals Administration.

The third quarter quota is 17 per cent larger than the quota of 1,495,000 lb. established last quarter, but 3 per cent lower than the average quarterly molybdenum exports in 1950.

New Swedish Sulphate Works

The Swedish State Forest Industries (Statens Skogsindustrier) are reported to be building an extension to their sulphate factory at Nederkalix. The extension will increase production of unbleached sulphate by about 40,000 tons a year. However, production is not expected to start until 1954.

Trichloroethylene Being Recovered

The National Production Authority in Washington is urging users of scarce trichloroethylene to send the contaminated chemical back to its manufacturers for reclaiming by distillation. Used trichloroethylene often contains 60 to 70 of recoverable material. Manufacturers of degreasing equipment have also volunteered to show users of their equipment how to operate it for maximum efficiency.

British Columbia Aluminium

Aluminium development in British Columbia, Canada, is going to start on a big scale shortly. The first stage will take three years to complete and the cost will probably exceed £70,000,000. Annual production is estimated at 150,000 tons of metal. Total cost may come to £200,000,000.

U.S. Ammonium Nitrate Plant

A new ammonium nitrate plant—the largest of its kind in the world, has just been put into operation by the Spencer Chemical Co., of Pittsburg, Ohio. Concentrated ammonium nitrate solution is dropped down two large 185-ft. high towers, counter-current to a flow of air which dries the nitrate into small spheres, or prills, by the time it reaches the bottom. Capacity of the two towers will be over 1,000 tons of fertiliser-grade nitrate per day.

Canadian Sulphur Distribution

An order issued by the Canadian Department of Defence Production provides for the review of sulphur distribution in Canada by the Chemicals and Explosives Division. By using this new procedure sulphur will be channelled into the necessary industries to carry out the defence programme and meet essential civilian requirements. For the purpose of the order, sulphur is defined as elemental sulphur in all commercial forms.

Sulphur Allocations

IMC Third Quarter Totals

THE International Materials Conference in Washington has allocated Britain 106,300 tons of sulphur for consumption in the third quarter of this year, of which 105,000 tons represents the amount imported and 1,300 tons local U.K. production. This level of imports is slightly higher than that of the first six months of this year, and most of it will come from America. The figures refer to crude sulphur only, the amount of crushed, ground, refined, sublimed and flowers of sulphur which enter international trade being too small to be worth allocating.

General reaction in this country to the allocation seems to be good. Industry and Government think it fair in the light of the sulphur scarcity, and the Board of Trade has announced that supplies to our industry based on the distribution scheme put into effect on 1 May of this year can be maintained at the present level without cuts.

The eleven member countries of the IMC are: Australia, Belgium (representing Benelux), Brazil, Canada, France, Italy, New Zealand, Switzerland, the Union of South Africa, Great Britain and the U.S. In reaching their unanimous conclusions, they considered forward requirements, conversion programmes now under way in certain countries, the special needs of defence, and the amount of sulphur-bearing materials other than native sulphur available to each country. Each case was examined carefully and the conclusions were reached by common consent.

Sub-Committee Set Up

The Sulphur Committee has set up a management sub-committee to deal with any procedural problems which may arise in connection with the allocation scheme.

Allocation schedule (in 1,000 long tons):

Country	Allocation	Import Quota	Export Quota
Argentina	8.2	—	—
Australia	31.6	21.6	—
Austria	6.5	6.5	—
Belgium and Luxembourg	17.8	17.7	—
Brazil	13.5	13.5	—
Canada[1]	—	—	—
Cuba	2.9	2.9	—
Finland	4.5	4.5	—
France	31.2	27.7	—
French North Africa	4.5	4.5	—
Germany	15.1	5.1	—
India	11.4	11.4	—
Israel	1.0	1.0	—
Italy[2]	36.0	—	17.7
Netherlands	0.6	0.5	—
New Zealand	16.6	16.6	—
Norway	6.3	—	18.7
South Africa	16.2	16.2	—
Sweden	15.1	11.6	—
Switzerland	6.8	6.8	—
U.K.	106.3	105.0	—
U.S.[1]	1050.0	—	250.0
Oil refineries in: Bahrein, Lebanon, Netherlands Antilles, Trinidad, Indonesia, Persia	8.5	8.5	—
Other countries	4.8	4.8	—
Totals	1399.9	286.4	286.4

[1] The Canadian allocation is included in the United States figure in column 2.
[2] Does not include 10,000 tons of crude sulphur to be exported as refined.

Parliamentary Topics

THE number of chemical engineers trained with Government assistance in 1946 and 1950 and the number being trained at present was the subject of questions by Mr. Ellis Smith in the House of Commons on 12 July. In an oral answer, Mr. George Tomlinson, Minister of Education, stated that the number of students following university courses in chemical engineering with the help of awards given directly from his department was 28 in 1946-47, and 151 in 1950-51.

TECHNOLOGICAL training and delay in any statement about the recent report on this subject was the cause of further questions to the Minister. With regard to improving facilities for technological education in this country, Mr. Tomlinson said he hoped soon to be able to make a statement on the matter. As for the report, the matter was being carefully considered and there were many facets of the question. It was better to make a right decision than a quick one.

ASKED if adequate steps were being taken to train sufficient numbers to secure the best results for this country when atomic power should be available for industrial purposes the Minister of Education replied that courses in atomic energy engineering were being organised at certain university institutions. It was too soon yet to state what was actually practicable or desirable, nevertheless, the Minister of Supply would continue to co-operate with the universities and with his Department in what further provision should be made for such courses.

The Chemist's Bookshelf

QUANTITATIVE ORGANIC MICROANALYSIS: BASED ON THE METHODS OF FRITZ PREGL. 5th English Edition. Revised and edited by Julius Grant. London: J. and A. Churchill, Ltd. 1951. Pp. ix + 342. Figs. 183. 30s.

The fourth English edition of this book appeared in 1945 (CHEMICAL AGE, 1945, *54*, 192). The new edition does not as yet, unfortunately, fulfil the hope aroused earlier that there might soon be achieved a proper presentation of the state of British quantitative organic microanalysis, uninhibited by too much looking at the past. The title, of course, raises obvious difficulties. But the scientist should not allow himself, through sentiment, to become too completely the historian. In this edition there is still far too much emphasis on the older Pregl methods, without a proper presentation of methods which have since been developed in this country and which, indeed, might almost have been said to have become standard practice, displacing the older procedures.

Thus, the use of a flowmeter and of a preheater in the carbon-hydrogen train, although sufficiently well-established to be included as alternatives in the Draft British Standard Specifications, are not discussed in the text. The whole treatment of the carbon-hydrogen determination, in fact, is essentially the same as in the previous edition, in spite of the fact that advances have occurred in the intervening years. The same is essentially true of the other topics which find a place in both editions, the principal change being the inclusion of quite brief references (including literature references) to the many advances, without any notable attempt, in most cases, to enlarge on these or to assess them critically.

The major additions to be found in the new edition are the inclusion of new sections on the determination of oxygen, the gravimetric hydrogenation method for nitrogen, Zimmermann's method for sulphur, the colorimetric estimation of phosphorus, and a 60-page section giving in detail the American recommendations and the British Draft Specifications for the standardisation of apparatus. One or two other sections, notably the determination of melting point, have been somewhat extended.

There are occasional lapses in editing. Thus, in the Table of Contents the subheading The Ultramicrochemical Balance, in Chapter I, has been carried over from the previous edition. In the text this section is now more properly headed Other Microchemical Balances.

Although some of the errors in the previous edition have now been corrected, others have survived. There is a curious slip in that while Fig. 26, which was upside down in the earlier edition, has now been righted, Fig. 22, correct way up before, has now been reversed. The use of the incorrect 'lead peroxide' for 'lead dioxide' is perpetuated.

The most serious editorial fault of all is that while about one-half of the section on choosing a microchemical balance is particularly concerned with the pointer scale, three out of the four balances earlier described in detail are equipped with projection reading devices. It is safe to guess that the bulk of new balances nowadays available are so fitted, so that the section on the pointer scale is more or less redundant.

The reviewer feels that the opportunity offered of making this an up-to-date critical text has not been grasped. There is too much insistence on older procedures and too little appreciation of the progress which has made some of these obsolescent if not obsolete. In only one case has there been noticed the complete omission of a section from the new edition on the grounds that it is now superseded—ebullioscopic methods for the determination of molecular weight. Such a decision is much more questionable than a number that might have been made.

This failure to take more advantage of the preparation of a new edition is the more unfortunate since it is clear that much work has gone into the revision. The wording

has obviously been carefully and extensively edited and improved throughout, and ambiguities have been removed. Incidentally, a more pleasing and readable type face has been employed.

The book is still a valuable reference work. The much extended bibliographies and the appendices on standardisation make it even more useful than the fourth edition. The reviewer's complaint is that the improvement might have been substantially greater, leaving microchemists even more in Dr. Grant's debt.—C.L.W.

AN INTERNATIONAL BIBLIOGRAPHY ON ATOMIC ENERGY. Vol. 2. SCIENTIFIC ASPECTS: Atomic Energy Commission Group, Department of Security Council Affairs, United Nations, New York: Sales No. 1950, ix.1. HMSO, P.O. Box 569, London, S.E.1. 75s.

This massive publication, which is stated to contain 880 pages (the pages are not numbered) lists over 24,000 references to material published during the 25 years from 1925 to 1949, and abstracted from the literature of 35 countries.

There are five major sections: (1) Fundamental Nuclear Science: (2) The Physics and Engineering of Nuclear Reactors: (3) The Biological and Medical Effects of High Energy Radiations: (4) Isotopes in Biology and Medicine: (5) Applications of Radioactive Tracers in Non-Biological Sciences and Technology. There is a comprehensive author index and a 30-page list of the journals from which abstracts have been made.

One cannot wholly avoid the feeling that this volume arises partly from a misdirected enthusiasm for cataloguing for the sake of cataloguing. And one wonders how far it would be possible, by the use of normal abstract literature, to track down any required information with at least as much ease as by the use of this work. Although the major sections have been extensively subdivided, insufficient attention would appear to have been given to the inclusion of material in its proper sub-division. Thus, many papers on deuterium studies are included in Chapter 5, although the chapter-heading would appear to suggest the exclusion of non-radioactive tracers.

Again, there is no subject-index—it is, indeed, difficult to see how a subject-index of this vast field could readily be compiled. So, to take an example at random, if one wishes to investigate the use of radioactive potassium as an analytical method of estimating potassium, one first consults the Table of Contents to find that the smallest subdivision which appears to have a bearing on the subject is C. Analytical Chemistry. 1, Physical and Chemical Techniques. This consists of about 300 references, arranged in alphabetical order of authors. These must be examined *seriatim*, to find two (with a possible third) references to this topic. This is surely not comprehensive. On the other hand, no process short of divination would lead the searcher to look in the same subsection for a number of the papers which *are* listed, such as 'Preparation of Crystalline Plutonium (IV) Phosphate' or 'The Preparation of Small Dense Thoria Crucibles'.

Another mystery is the process of selection by which some of the papers from *The Transuranic Elements* (NNES IV-14 B) are included while others, as far as can be determined from the author index, are not. One would expect all the papers in this latter publication to come sufficiently under the heading of Atomic Energy to warrant their inclusion. Had none been listed, one would have assumed that the date of publication of *The Transuranic Elements* was too late to permit of reference to it, but this is obviously not the answer.

Perhaps familiarity derived from constant use will remove some of the difficulties in tracking down the required information. It is easy to appreciate that an enormous amount of work has gone into compiling this volume, and that the problems raised in presenting the information in a wholly satisfactory manner are probably insoluble.

When one realises that this is Volume 2 (Volume 1 and its supplement having dealt with political, social and economic aspects) there is brought home in telling fashion some slight appreciation of the vast mass of material, factual and speculative, which has been written on the various aspects of atomic energy in a relatively few years.—W.

Du Pont Enlarge Laboratories

The mammoth Du Pont de Nemours Company of America has recently opened its new, enlarged and consolidated experimental station laboratories near Wilmington, U.S.A., probably the largest research centre in the country. Their are nine separate laboratory buildings, and chemical engineers are prominent in them.

· PERSONAL ·

Evans Medical Supplies, Ltd., announce the appointment of MR. D. W. MARTIN, B.Sc., F.R.G.S., formerly its representative in the West Indies, to be representative in Hong Kong. MR. H. COOPER has been appointed chemists' representative for North-East Lancashire. MR. C. J. RYE and MR. F. C. B. SENDALL retired on 30 June after 45 and 26 years' service respectively. Mr Rye, who terminated his post as sales manger, had for many years travelled in Australia, New Zealand, South Africa and the Mediterranean area. Mr. Sendall was latterly manager of the Drug Receivers department.

Consequent upon the retirement of SIR GEORGE LEGH-JONES as a managing director, MR. F. J. STEPHENS has been appointed a managing director of The Anglo-Saxon Petroleum Co., Ltd., and of The Shell Petroleum Co., Ltd., and a delegate member of the board of N.V. de Bataafche Petroleum Maatschappij, The Hague, which are the three principal operating companies of the Royal Dutch/Shell Group. These appointments are effective from 11 July.

MR. A. D. HUSBAND, chief chemist to the Department of Agriculture, Southern Rhodesia, is shortly to retire after 25 years. At a farewell gathering before he went on leave pending retirement, the Minister, MR. J. M. CALDICOTT, paid tribute to him and presented him with a silver tea service on behalf of the staff. Before the 1914-18 war Mr. Husband was an assistant in the department of pathological chemistry, university of Toronto, and from 1919-26 was research chemist at the North of Scotland Animal Nutrition Institute. In Rhodesia he was responsible for chemical investigations which led to the production of absorbent cotton wool, at Gatooma.

In 1883, with his brother William, Mr. Fraser leased the shale in the Pumpherston Estates, Midlothian, and afterwards they became the joint founders of the Pumpherston Company. Mr. Archibald Fraser was secretary and commercial manager until 1887, when he was appointed general manager. He resigned from active management in 1910, but remained a director of the company until the amalgamation of all the shale oil companies some years later.

The Wool Bureau, Inc., New York, has awarded its first fellowship for study in England to MR. GERALD LAXER, assistant development and research chemist at Alexander Smith, Inc., Yonkers, New York. He has been accepted as a candidate for a degree at Leeds University, and will begin his studies in October. This Anglo-American fellowship is the first of a series projected by the Wool Bureau in co-operation with the International Wool Secretariat. The organisation plans eventually to award three fellowships for work in leading overseas laboratories in order to encourage closer relations between laboratories and individuals engaged in scientific investigations of wool fibre and wool manufacturing methods throughout the world.

SIR EDWARD APPLETON, vice-chancellor and principal of Edinburgh University, was last week presented with the Sir Dabaprasad Sarbadhikary Gold Medal in recognition of his scientific work. The presentation was made by Mr. Krishna Menon, High Commissioner for India in the Senate Hall of the Old College. The Medal, which is given every two years by the University of Calcutta, has now been awarded five times.

LORD MCGOWAN, 77-year-old honorary president of I.C.I., was recently entertained at a private dinner-party arranged by the directors of the Dyestuffs Division in Manchester. He also visited Huddersfield where, at the Division's largest factory, he received a presentation to mark his retirement last year from the chairmanship of the combine, which he had held since 1930.

Obituary

The death has occurred at Pendholme, West Kilbride, Ayrshire, of MR. ARCHIBALD FRASER, who was associated with the Scottish shale industry for more than a quarter of a century and played a leading part in the building-up and success of the Pumpherston Oil Company. He was 95.

Publications & Announcements

AIR SEPARATION plants for oxygen, nitrogen and the rare gases, the first of their kind to be manufactured in Great Britain on a commercial scale, are the subject of an illustrated booklet just issued by Petrocarbon, Ltd. While specially designed units can be supplied to meet individual requirements, four standard types are available as follows: 'R' small plants to supply liquid nitrogen for use as a low temperature refrigerant in research laboratories. 'S' small gaseous oxygen plants to supply oxygen for welding, cutting, etc. 'D' medium-sized oxygen or nitrogen plants. These are of the high pressure double column type, while not being quite so simple or compact as the type 'S', are more economical in power and consumption. 'T' ideal for supplying oxygen or nitrogen to continuous chemical processes and for rare gas production. Automatic control can be provided if required. Among the industries served by the products of these air separation plants are: iron and steel; gasification of solid fuels; hydrocarbon oxidation; biochemistry and fermentation; chemicals; and synthetic fertilisers.

* * *

HIGH temperature refractory materials are being increasingly used for laboratory ware. Some of the wide range of products made from thermal mullite, alumina, magnesia, spinel, zircon, zirconia, and thoria have been listed in an illustrated booklet now available from the Thermal Syndicate, Ltd. Wallsend, Northumberland. Tube, crucibles, filtering devices, muffles and trays, dishes, mortars and pestles are just a few of the examples given.

* * *

RECOMMENDATIONS made in the fourth report of the Gas Cylinders Research Committee of the Department of Scientific and Industrial Research (1929) were adopted in B.S.401, 'Steel cylinders for the storage and transport of liquefiable gases, with recommended filling ratios for ten liquefiable gases.

The British Standards Institution has now published B.S.1736—'Filling ratios for liquefiable gases,' which specifies filling ratios for 33 gases, two ethylene oxide mixtures, and hydrocarbon gas mixtures.

Copies may be obtained from the British Standards Institution, Sales Department.

'SULPHUR—Friend and Enemy,' is the title of an article in 'Steel News' (Vol. 2, No. 6), published by the British Iron and Steel Federation. It is shown how sulphur in steel makes it liable to crack when worked, while on the other hand, in the form of sulphuric acid, it plays an essential part in the manufacture of many forms of finished steel, especially tinplate. Other articles deal with the iron and steel industries of the Far East, and labour relations in the steel industry.

* * *

A USEFUL and comprehensive list of books suitable for inclusion in works' libraries which should be of great value to research and technical staffs considering new acquisitions to their libraries has recently been published by George Over (Rugby), Ltd., the well-known Midlands bookshop. Divided into fourteen sections, with a brief list of likely journals at the end, the booklet deals with chemistry, organic, inorganic and industrial; physics, heat and thermodynamics; metallurgy; engineering science; mechanical engineering; electrical engineering; electronics and radar; radio communication and technique; plastics, pure mathematics and the calculus; encyclopædias, and dictionaries. The booklet can be obtained free of charge from Rugby.

* * *

PROTECTION against pilferage and fire must always be the concern of large chemical firms, and this becomes increasingly important when goods are scarce, expensive, and difficult to replace. Advantages of the Blick watchman's clock, which may also be used for recording the opening and closing of laboratories, are set out in a leaflet available from Blick Time Recorders, Ltd. The company's range of equipment and services also includes time recorders, master clock and staff locating systems, and wiring installations.

* * *

UNDERWATER drilling for oil is a potential new source of natural wealth. How it is being exploited in several parts of the world, despite the heavy costs of research, is told and illustrated in the current issue (No. 25) of 'Rope Talks' published by British Ropes, Ltd., Doncaster and London.

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

PETROCHEMICALS, LTD., London, W. (M., 21/7/51). £2,350,000 prior lien loan stock secured by a Trust Deed dated 27 April, 1951; charged on specified properties and shares, benefit of agreement for lease and a general charge. *£4,300,000. 23 May, 1950.

Satisfaction

QUICKFIT & QUARTZ, LTD., London, W., importers of silica, quartz, etc. (M.S., 21/7/51). Satisfaction, 10 May, of charge registered 26 January, 1949.

Increases of Capital

BRITISH DOMOLAC COMPANY LTD., by £50,000, in £1 6 per cent cumulative redeemable preference shares, beyond the registered capital, of £10,000.

EAST LONDON CHEMICAL WAREHOUSE CO., LTD., 5-6 Clements Inn, W.C.2, by £900, beyond the registered capital of £100.

LEON FRENKEL LTD., by £50,000, in 12,500 ordinary and 37,500 preference shares of £1 each, beyond the registered capital of £55,000.

New Registrations

W. H. Boddington & Co., Ltd.

Private company. (497,339). Capital £3,000. Objects: To purchase, make, produce, manufacture, process, prepare or otherwise deal in and manipulate minerals, metals, plastics, stone, timber, chemicals, drugs, gases, etc. The subscribers are: Wm. H. Boddington, Church Farm Cottage, Paddock Wood, Kent, plastics goods manufacturer; and Francis F. Fether, 50 Malvern Road, Hornsey, N.8, plastic moulder. Solicitors: S. A. Redfern, Barrow & Martin, 3 Grays Inn Place, W.C.1. Reg. office: 6 Bedford Row, W.C.1.

De Vismes Partners & Son, Ltd.

Private company. (497,306). Capital £100. Objects: To carry on the business of industrial consultants, buyers and suppliers of machinery and plant and equipment for the home and export markets, distributors of food and chemicals, etc. Directors: Count de Vismes and Countess de Vismes, both of 2 Devonshire Terrace, W.1. Reg. office: 2 Devonshire Terrace, W.1.

Glyocel, Ltd.

Private company. (497,358). Capital £100. Objects: To carry on the business of patent medicine manufacturers of and dealers in all kinds of medicinal preparations, etc. Directors: John Glynne, Mrs. Yetta Glynne and Charmian Glynne, all of 16 Marlborough House, Green Lanes, N.4. Secretary: Patricia Harris. Reg. office: 18 Maddox Street, W.1.

Gordon Harris, Ltd.

Private company. (497,408). Capital £4,000. Objects: To carry on the business of consulting, analytical, manufacturing, pharmaceutical and general chemists, etc. Directors: Gordon Harris and Mary M. Harris, both of 6 Mornington Avenue, Ilford; and Constance E. Harris and Edgar H. Morling. Secretary: Ethel M. Whisker Registered office: offices of Ernest J. George & Co., 329 High Holborn, W.C.1.

International Paints Exports Ltd.

Private company. (497,249). Capital £1,000. Objects: To acquire the paint export undertaking and certain of the assets of International Paints (Holdings), Ltd., etc. Subscribers (each with one share) are: J. Emmitt, 102 Park View Road, Welling, Kent, solicitor's clerk; and E. Starling, 15 Ely Close, New Malden, Surrey, solicitor. Solicitors: Ashurst Morris Crisp & Co., 17 Throgmorton Avenue, E.C.2. Reg. office: Grosvenor Gardens House, Grosvenor Gardens, S.W.1.

E. Margerrison, Ltd.

Private company. (497,355). Capital £7,500. Objects: To carry on the business of consulting, analytical, manufacturing, pharmaceutical and general chemists, etc. Directors: Ernest Margerrison and Mrs. Fannie Margerrison, both of The Poplars, Holyhead Road, Oakengates. Secretary: M. Ellen Margerrison. Reg. office: 45 Market Street, Oakengates, Salop.

Market Reports

LONDON.—A continued pressure for supplies has been experienced on most sections of the market during the past week and a good volume of enquiry from overseas remains in circulation. So far as the general run of the soda products and the potash chemicals are concerned, a steady movement is reported against contracts, and for most items there is a ready outlet for spot parcels. There has been an active demand for the barium compounds with offers of barium nitrate scarce, while supplies of calcium carbide are restricted for home requirements. Tartaric acid remains in good request at the higher price now ruling with little available for export, and a steady demand continues for acetone and other solvents. There is a good demand for the non-ferrous metal compounds and owing to an increase in the controlled price of pig lead, lead oxide prices have advanced by £19 10s. per ton. The new bases prices are as follows: dry red lead £198 per ton; dry litharge £198 per ton; dry orange lead £210; red lead ground in oil £219; orange lead ground in oil £231. For the same reason dry white lead has advanced in price by £19 and the ground white lead by £16 10s. per ton.

MANCHESTER.—Annual holidays at a number of industrial towns in Lancashire have left their mark on the movement of supplies of heavy chemicals, but in spite of this seasonal factor a satisfactory flow of delivery specifications has been reported on the Manchester market during the past week, more especially in those products which continue in relatively short supply. New bookings for home consumption as well as on export account have been on steady lines. Principal price movements during the week have been a stiffening in the lead and zinc products as a result of advances in the metals. The tar products generally are very firm and in good demand.

GLASGOW.—The Scottish heavy chemical market has been extremely quiet over the past week due to the approaching Glasgow Fair Holidays which commenced on Friday of this week. The export market has been fairly steady.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

A PROGRESSIVE chemical manufacturing organisation in South Eastern England has a vacancy for a well qualified **CHEMIST** in their large and well equipped laboratories. The vacancy is an important one with good prospects. Applicants should be graduates, with an Honours degree and particularly interested in applied inorganic chemistry with previous experience in conducting, supervising and organising laboratory investigations. The preferred age for applicants is 30-36. The appointment is a pensionable one and carries a good salary according to qualifications and experience. Write giving full details, in confidence to Box No. C.A. 3029, THE CHEMICAL AGE, 154 Fleet Street, London, E.C.4. **AMENDED.**

ASSISTANT EXPERIMENTAL OFFICERS (including biologists) in various Government Departments.

The Civil Service Commissioners invite applications for permanent appointments. Interviews will be held shortly after the receipt of the completed application form and successful candidates may expect early appointments. The posts are in various Government Departments and divided between following main groups and subjects: (a) Mathematical and Physical Sciences; (b) Chemistry and Metallurgy; (c) Engineering Subjects and (d) Miscellaneous (including e.g. Geology, Library and Technical Information Services). A few vacancies have now arisen for biologists interested in pest infestation control, forensic science or fisheries problems, and there may be one or two posts for biologists with other interests.

Candidates must be at least 17½ years and under 26 years of age (or under 31 for established Civil Servants of the Assistant (Scientific) Class) on 1st August, 1950; time spent on a regular engagement in H.M. Forces may be deducted from actual age. Candidates must have obtained the Higher School Certificate with mathematics or a science subject as a principal subject, or an equivalent qualification; but candidates without such qualifications may be admitted exceptionally on evidence of suitable experience. Higher qualifications will be regarded as an advantage to candidates over the age of 20.

The inclusive London Salary Scale (men) is £250–£535; (women) £250–£445. Salaries for posts in the provinces are somewhat lower. Superannuation provision is made under the Superannuation Act.

Further particulars and forms of application from the **Civil Service Commission, Scientific Branch, Trinidad House, Old Burlington Street, London, W.1, quoting No. 3068** Completed application forms should be returned as soon as possible and must in any case be received not later than 1st October, 1951.
11722/150/WP.

NORTH WESTERN GAS BOARD
FYLDE GROUP
CHIEF CHEMIST

APPLICATIONS are invited for the above Group appointment. Candidates should have a broad Gas Works experience; Associateship of the Royal Institute of Chemistry or a British University degree will be an advantage. The successful applicant will be responsible for the work of the chemical staff and must be capable of supervising the chemical control of coal carbonisation, carburetted water gas production plant, purification and by-product plant.

The salary will be within Grade A.P.T.11 of the National Salary Scales (£645-£770 per annum).

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, giving personal details, particulars of training, qualifications and experience, together with the names of two referees, should reach the **General Manager, North Western Gas Board, (Fylde Group), Gas Offices, Princess Street, Blackpool,** within 14 days from the publication of this advertisement.

SITUATIONS VACANT

PRODUCTION CONTROL.—Applications are invited for positions in charge of production at a modern factory making margarine and edible oils.

Candidates (who should be between 24 and 32) should have obtained a degree or equivalent qualification in chemistry or chemical engineering and, for preference, should have had some industrial experience but not necessarily in the field of oils and fats. They should be prepared to work on shift and to serve overseas if required to do so.

Successful candiates will be given a comprehensive course of training before entering on their regular duties.

The salary offered will be appropriate to age, qualifications and experience but will not be less than £550 p.a.

There is a generous (contributory) Superannuation Scheme, and prospects for advancement are excellent.

Write (giving full details), to the **Personnel Manager, Messrs. Van den Berghs & Jurgens Limited, Stork Margarine Works, Bromborough Port, Cheshire. AMENDED.**

SENIOR SCIENTIFIC OFFICERS; SCIENTIFIC OFFICERS.—The Civil Service Commissioners invite applications for permanent appointments to be filled by competitive interview during 1951. Interviews began in January and will continue throughout the year, but a closing date for the receipt of applications earlier than December, 1951 may eventually be announced. Successful candidates may be appointed immediately. The posts are in various Government Departments and cover a wide range of Scientific research and development in most of the major fields of fundamental applied science. Candidates must have obtained a University Degree with first or second class honours in a scientific subject (including engineering) or in Mathematics, or an equivalent qualification, or possess high professional attainments. Candidates for Senior Scientific Officer posts must in addition have had at least three years' postgraduate or other approved experience. Candidates for Scientific Officer posts taking their degrees in 1951, may be admitted to compete before the result of their degree examination is known.

Age Limits: For Senior Scientific Officers, at least 26 and under 31 on 1st August, 1951; for Scientific Officers, at least 21 and under 28 (or under 31 for established civil servants of the Experimental Officer class) on 1st August, 1951. London Salary Scales: Senior Scientific Officers, (men) £750–£950; (women) £625–£850. Scientific Officers, (men) £400–£650; (women) £400–£525. Somewhat lower rates in provinces.

Further particulars from the **Secretary, Civil Service Commission, Scientific Branch, Trinidad House, Old Burlington Street, London, W.1, quoting No. 3399.**
12233/120/WP.

EAST MIDLANDS GAS BOARD
LEICESTER & NORTHANTS DIVISION
LEICESTER & LOUGHBOROUGH UNDERTAKINGS
VACANCIES FOR WORKS CHEMISTS

VACANCIES exist in the Leicester and Loughborough Gas Undertakings for Works Chemists. Applicants should have had some practical training in industrial chemistry but previous experience in the Gas Industry is not essential. The salary will be in accordance with Grade APT. 4 of the National Salary Scales for Gas Staffs, salary range £275 to £460 per annum.

The positions offer good prospects and the opportunity of obtaining experience and training in general Gas Works Engineering.

The successful candidates will be required to undergo a medical examination and the appointments will be subject to the provisions of any Superannuation Scheme which may be adopted by the Board.

Applications in writing, stating age, qualifications and experience, should be addressed to **Mr. W. A. Pask, Sub-Divisional Manager, East Midlands Gas Board, Leicestershire & Rutland Sub-Division, Millstone Lane, Leicester,** to be received not later than 7th August, 1951.

C. C. WOOD,
Divisional General Manager

SITUATION VACANT

PROJECT ENGINEER for gasworks, tar works and general chemical plant. Salary from £700 per annum according to qualifications. Pension scheme. Permanent position. Apply: **The Chemical Engineering & Wilton's Patent Furnace Co., Ltd., Horsham, Sussex.**

AGENCY

SWITZERLAND

WELL established firm interested in agency agreement with leading British Chemical Works for sale of industrial Chemicals for paints, paper, textiles, soap, cosmetics, etc., Coal and Coke derivatives, Naphthalene, etc.

Please write to: Box P21454 Z Publicitas Zurich 1, Switzerland.

FOR SALE

600

MIXING MACHINES

Vert. copper lined **S.J. MIXER** by J. Baker, 2 ft. 4 in. diam. by 2 ft. deep, with contra rotating brass agitators overdriven through bevel gear by F. and L. pulleys. Jacket suitable 20 lb. pressure.

Vert. Cyl. **VORTEX MIXER** by Morton, water jacketed. Stainless steel emulsion chamber 18 in. I.D. by 22 in. deep, with hinged lid. 1 in. bottom run off. Motorized 400/3/50. Unit mounted on C.I. stand.

Totally encl. **MIXER,** approx. 6 ft. int. diam. by 6 ft. deep on straight, 3 ft. hemispherical bottom. Domed cover. 6 in., 4 in., 3 in., 2 in. and 1½ in., connections to cover, with 18 in. diam. hinged manway. Three 2 in. connections in side, and 5 in. and 3 in. bottom outlets. F. and L. pulley drive.

M.S. MIXER, homogeneously lead lined. 4 ft. 8 in. diam. by 4 ft. 5 in. deep on straight, 1 ft. 3 in. cone bottom. Cap. approx. 500 gals. Propellor type agitator motorized 400/3/50, speed 1430/75 r.p.m. Fitted bolted on cover with connections. Ancillary equipment includes motorized fume extraction fan and lead lined dosing pot 15 in. diam. by 2 ft. deep.

Totally encl. **M.S. BLENDING** vessel 4 ft. 5 in. diam. by 6 ft. 7 in. deep, 2 in. run off. Fitted bolted dome cover, 2 in. agitator shaft. 1 in., 1½ in., 2 in. and 3 in. flanged connections in cover.

5 **VERT. MIXERS** 3 ft. 6 in. diam. by 2 ft. 6 in. deep, of 3/16 in. M.S. plate. Twin underdriven scraper agitators. Hinged cover with 12 in. diam. feed. Bottom side 5 in. diam. outlet. Motorized 400/3/50.

2 vert. cyl. **MIXERS,** 3 ft. diam. by 6 ft. 8 in. deep, on straight with 9 in. cone bottom to 2 in. diam. outlet. Vert. shaft propellor type agitators. 2½ in. o.d. int. steam coils. Vessels T/E. Flat bolted cover with 3 in. and two 1 in. connections. 15 in. diam. manhole in side.

5 Peerless **MIXERS,** 80 qt. cap., fitted integral motor 400/3/50, with various whisks and beaters.

3 C.I. horiz. double trough **S.J. MIXERS** by Smedley. Int. dimens. 3 ft. 6 in. by 3 ft. 6 in. by 2 ft. 3 in. deep. Double Naben type agitators. F. and L. pulley drive. Power tilting clutch op.

S.J. TROUGH MIXER by Melvin, 3 ft. 2 in. by 2 ft. 9 in. by 2 ft. 6 in. deep. Double geared and with counterbalanced hinged lid. Mechanical tipping off main drive. Troughs tin sprayed internally. Twin Naben type agitators. Driven by 10-h.p. flameproof motor 200/3/50, through chain and sprockets.

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